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ERRATA ET CORRIGENDA.

Page 257, line 26, for *Guepira* read *Guapéva*
„ 258, „ 8 from bottom, *for* introrsum *read* extrorsum
„ 262, „ 16, for *arareite* read *araruta*
„ 286, „ 6, *for* F. Gliemann *read* T. Gliemann
„ 291, „ 25, for *Sir J. Mackenzie* read *Sir G. Mackenzie*
„ 292, „ 1, *for* Sibthorp *read* Lighfoot
„ 298, „ 9, for *bifolia* read *biflora*

THE JOURNAL

OF

THE LINNEAN SOCIETY.

On the Copal of Zanzibar. Extract from a letter from JOHN KIRK, M.D., F.L.S., dated Zanzibar, March 20th, 1868.

[Read June 18, 1868.]

THE vegetation along the creek of Dan Salam * consists of many curious and, to me, unknown bushes, with heavy timber scattered here and there; among them was the *Trachylobium Mossambicense*, Kl., distinguished by its rounded head of glossy leaves, with white groups of flowers projecting from the points of the branches. This is the "M'ti Sandarusi" (Tree of Copal) of the natives; and from it one variety of Copal is obtained. On examining the tree more closely, the trunk and main limbs were seen to be covered with the clear resinous exudation, now brittle and hard; from the upper branches it dropped down on the ground below, but not in a fluid state. To judge by the appearance it presented, I should say that the resin soon dries and hardens after being exuded, but must be easily broken off by violence; pieces of various tint and form were collected, some with insects imbedded; but all presented a smooth polished exterior, quite free from any pitting or "gooseskin" found on all kinds dug up from the ground. This sort is known in trade as "Sandarusi ya m'ti," or Copal from the tree; it is exported in considerable quantity to India, but not to Europe. Having thus established the source of one sort of Copal to be the *Trachylobium*, and transmitted the resin with full herbarium specimens of flower and fruit (which, if

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* [Dan Salam is stated in the letter to be a spacious creek opposite the southern end of Zanzibar Island.—ED.]

I mistake not, are to this day desiderata in all our collections), let me briefly state my reasons for thinking that in this tree we have the source of the older Zanzibar Copal, the semifossil or bituminized resin known in the English market as "Animé," and which is the most valuable of all resins for the manufacture of varnish, exceeding anything produced on the west coast for hardness, elasticity, and polish.

There are three distinct kinds of Copal in the Zanzibar trade, subdivided by merchants into many classes, according to colour, form, surface, and other peculiarities known to those in the trade, and affecting the value variously in different markets: first, we have "Sandarusi-m'ti," Tree-Copal; second, "Chakazzi," or Copal dug from the soil, but modern (seemingly) in origin and obtaining a price like that of the former quality; the third is the true Sandarusi, like the second, dug from the soil, but hard, less soluble, and more than twice the value. This forms by far the greatest part of Zanzibar Copal, the export of which has sometimes reached 800,000 lbs. at a value of £60,000.

I have already described the "Tree-Copal:" it is gathered directly from the tree, which is known along the coast from Mozambique to near Lamo, or from 3° to 15° south lat., but is most common between Cape Delgado and Mombas. The *Trachylobium Mossambicense,* Kl., is found along the creeks and on the maritime plain or the old sea-beach, but becomes very rare at a little distance inland, and quite unknown long before the change in geologic structure offers an explanation of its absence. It requires the near presence of the sea for its growth, and dies when far removed from its influence.

The second sort, or "Chakazzi" gum, is found in the ground at the roots of modern Copal-trees, or in the country where these exist; but it is also, I am told, to be got with true Copal. That it is found near the existing forests is certain; and there the true Copal is not known; and we must accept with caution the statement that it is also found in the interior, from this well-known fact, that our informants habitually mix the inferior coast-gum with the valuable produce of the interior. This "Chakazzi" is obviously the recent gum which has remained a short time in the soil after the death of the tree which produced it, yet long enough to take the impression of sand and stone, or other hard matter, as the hardest sealing-wax long left on a coin will take the impression, or as ice will flow down a valley.

The Tree-Copal, or "Animé" of the English markets, is undoubtedly the produce of forests now extinct; for there is no tree now growing at a distance from the coast which produces it. It is obtained all along the ancient sea-beach, the maritime plain which here fringes the continent to a depth of 20–40 miles in general. Some spots are richer than others, and some soils indicate good "diggings." When the rains which follow the north-east monsoon have softened the soil, the natives of the country commence to dig this from small pits, searching the soil as removed; but there is no system, and, like the gold-washings of Africa, so the Copal-regions yield not a fraction of what a little system and industry might produce. At present every clan-feud stops the search. The producer receives, even when successful, only a trifle from the Indian merchants, who again part with it, often paying enormous dues to the Zanzibar State, to the European and American traders. The supply, considering the extent over which it is scattered, seems unlimited; for at present, with most inadequate means and much discouragement to the labourers, the amount obtained is very great.

If we take into account the similarity of the recent and fossil resins in appearance, their near approach in physical properties, the fact that the recent gum, often being imbedded in sand, takes the characteristic surface-markings, and recollect that where now the good Copal is dug as a fossil the present Copal-tree, in all probability, once grew, when the sea was nearer to the hills than now, I think we may be satisfied that the *Trachylobium* was the source of the old Copal, which is the resin only modified by time and long exclusion from air and light under the ground.

Perhaps it may be asked, Is there not proof in the gum itself that the *Trachylobium* then existed? I have as yet found none: insects (all of them aerial) are often preserved; sometimes branches and leaves; but I have not seen evidence of the Copal-tree. When we remember that the resin soon hardens after being exuded, and that it runs from the underside of the main limbs, while the leaves, flowers, and fruit are at the extremities of the branches, we shall see that leaves of the underwood which sweep the lower branches are much more likely to be embalmed than the leaf of the tree itself, which, besides, is hairy, glossy, and unlikely to adhere. If a part of the modern tree were found in the old hard gum, the proof would be complete; at present some doubt remains.

I have sent not only full herbarium specimens, but also specimens of the recent gum, of the "Chakazzi," and of the valuable Copal, in which are many insects; and I would suggest that entomologists should assist us by their opinions whether these belong to existing species or not.

An Enumeration of the Palms of Sikkim. By Thomas Anderson, M.D., F.L.S., Superintendent of the Royal Botanical Gardens, Calcutta.

[Read June 18, 1868.]

The deep valleys of Sikkim, which are fully exposed to the moist winds blowing from the Bay of Bengal, are filled with a luxuriant vegetation abounding in tropical forms. Among these are several species of Palms possessing considerable interest from their occurrence in comparatively so northern a region. Dr. Hooker, the first botanical explorer of Sikkim, found ten species of Palms in that country *; and in the introductory essay to the 'Flora Indica,' p. 183, Drs. Hooker and Thomson again state the numbers at ten. By repeated explorations in the Teesta valley, I have been able to add five species to that number, but I have never found *Areca disticha* and *Licuala peltata*, both of which are included in the number of Palms in Sikkim given by the authors of the 'Flora Indica.' I have thus seen fifteen species of Palms in the forests of Sikkim, belonging to the genera *Areca*, *Wallichia*, *Caryota*, *Calamus*, *Plectocomia*, *Livistona*, and *Phœnix*,—also specimens of *Licuala peltata*, from Sikkim, in the Herbarium of the Botanical Gardens, Calcutta. *Calamus*, the most extensive genus of Palms in Asia, is represented in these forests by seven species, while the other genera, except *Wallichia* and *Phœnix*, which contain two species, are illustrated each by one species. *Calamus schizospathus* belongs to the non-scandent *Zalacca*-like section of the genus; but, exclusive of it, there are seven climbing Palms in Sikkim, as *Plectocomia Himalayana* is popularly a Rattan, and as powerful a climber as any *Calamus*.

The sudden diminution in moisture which takes place almost at the frontier between Nepal and Sikkim does not favour the growth of such tropical plants as Palms. Accordingly we find only *Wallichia oblongifolia,* two species of *Calamus,* and *Phœnix acaulis* extending along the Himalayan chain to the west of Sikkim. Two other Palms, for which the climate of Sikkim is too wet, are added to the number; these are *Phœnix sylvestris* and *Chamærops Martiana.*

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* Himalayan Journals, i. 143.

In Sikkim the Palms mentioned in this enumeration are most abundant in the hot and very damp valleys of the Mahannuddee and the Teesta rivers in the eastern part of Sikkim. They are apparently common in Bhotan, at least on the outer hills.

None of the cultivated Palms of Bengal are grown in Sikkim, or even in the Terai, at the foot of the hills; *Areca catechu* ceases along with the cultivation of "Pawn" (*Piper betle*) at Suneezee Kottah, about twenty-five miles from the Himalaya. In the adjoining districts of Bhotan, on the east bank of the Teesta, *Areca catechu* abounds near the villages of the Mechis, within a few miles of the hills. Old trees of *Caryota urens* also occur near the wooden stockade of the Bhoteas, as far south as Mynagoree. The Lepchas, who have many claims to be considered the aborigines of Sikkim, are familiar with the Palms of their native forests, and have given distinct names to all of them except *Phœnix rupicola* and *Licuala peltata.* These Lepcha names are quoted under each species.

Tribus I. ARECINEÆ.

ARECA, *Linn.*

A. GRACILIS, *Roxb. Fl. Ind.* iii. p. 619; *Griffith, Palms of British East India,* p. 154, tab. 232 A, B, C.—Seaforthia gracilis, *Mart. Palm.* p. 185.

Hab. Moist tropical valleys; valleys of the Great Rungeet and the Teesta.

This Palm grows gregariously under the shade of trees in the densest tropical forests of Sikkim. I have seen it in the lower part of the valley of the Great Rungeet and along the banks of the Teesta, throughout the course of the river in British Sikkim and Bhotan, also in the narrow valleys of the streams entering the Teesta below its confluence with the Great Rungeet. I have not noticed this Palm in the dry forests at the foot of the hills. It ranges in altitude from 400 feet in the Teesta valley to 2500 feet in the Runjo near the plantations of *Cinchona succirubra.* This species of *Areca* is found also in the Khasia hills, Assam, Bhotan, and Chittagong. Sikkim is the most western district in which it occurs. The plant is well known to the Lepchas, who call it "Khur;" but they make no use of any part of it. *Areca disticha*, Roxb., is said to occur in Sikkim; but I have never met with it.

WALLICHIA, *Roxb.*

1. W. OBLONGIFOLIA, *Griff. Calcutta Journ. of Nat. Hist.* v. p. 486; *Palms of British East India*, p. 175, tab. 237 A, B, C.

Hab. In all the tropical valleys of Sikkim.

This little Palm is abundant in all the tropical valleys of Sikkim, where it usually grows under the shade of rocks or trees. It seems to prefer a soil composed of disintegrated micaceous shale. It ranges in altitude from 400 to 3000 feet above the sea. It is found along the lower ranges of the Himalaya, and in the valleys of the great feeders of the Ganges and Brahmaputra, from Assam to Kumaon, where its western limit is attained in the valley of the Surjoo.

2. W. DISTICHA, *T. Anders.* Caule elato parce sobolifero, foliis distichis, pinnis fasciculatis basi conduplicatis, spadicibus terminalibus demum lateralibus, spathis basilaribus profunde fissis, baccis apice obscure bifidis vel raro trifidis, dispermis, rarissime trispermis.

Hab. In præruptis siccis vallium profundarum Sikkimensium, præsertim exteriorum, ad altitudinem 300–1500 ped.

Caudex 10–15 pedes altus, 5–6 uncias crassus, nudus, cinereus, a lapsu frondium annulatus. *Folia* alterna, erecta, 6–10 pedes longa. *Petiolus* basi cum reti rigido, caulem amplectens. *Rachis* utrinque convexa. *Pinnæ* suberectæ, 2–8 fasciculatæ, lineari-lanceolatæ, apice truncatæ vel cuneatæ, fimbriato-dentatæ, marginibus ad apicem remote denticulatis, supra virides, subtus albidæ, glaucæ, uninerviæ, 1–2 pedes longæ, 2–2½ uncias latæ. *Spadix* fœmineus pendulus, 6–8 pedes longus, rachi cinerea, 3 unc. crassa; rami simplices, sinuati, apice attenuati, glabri, atro-virides vel nigri. *Spathæ* fibroso-coriaceæ. *Sepala et petala* persistentia, submembranacea, glabra. *Bacca* oblonga, basi calyce et corolla persistentibus suffulta, glabra, rubescens, 9 lin. longa. *Pulpa* vix ulla, urens. *Embryo* dorsalis, excentricus. *Albumen* planum.

The appearance of this Palm is very peculiar, from the manner in which the leaves are ranged along two opposite sides of the stem, as in *Ravenala*.

I have found this Palm growing gregariously, but very locally, on the steep sandstone declivities in the deep valleys of Eastern Sikkim, between the rivers Mahanuddee and Teesta. The Lepchas call it "Katong;" they make no use of any portion of the plant; and they dread touching even its leaves, from the reputed irritating properties of the plant. I know, from personal experience, that the berries irritate the skin, as I suffered from slight urticaria on the hands and face after examining the seeds. Plants of this species have been cultivated in the Botanical Gardens, Calcutta, for the last fifteen years, under the name *Caryota mitis*: but I have not been able to trace their history. They were probably introduced from the Himalayan ranges to the east of Sikkim. Griffith apparently found this Palm in the Mishmi hills. At page 46 of the 'Journal of Travels,' he refers to a Palm thus:—"Wallichoidea, trunco 3–10-pedali."

CARYOTA, *Linn.*

C. URENS, *Linn. Fl. Zeyl.* p. 369; *Sp. Pl.* 1660; *Mart. Palm.* p. 193, tab. 107, 108, p. 162, tab. V. fig. 1, et Y. figg. 1, 2; *Griffith, Palms of British East India*, p. 169.

Hab. In dense forests from the level of the plains to 4000 feet above the sea.

This Palm is not common anywhere in Sikkim, although trees of it may be met with in most of the valleys. It can resist a considerable degree of cold; two large trees of it are growing naturally in the Cinchona plantations at Rungbee, near Darjeeling, at a height of 4400 feet above the sea, where the temperature of the air in January is often as low as 40° Fahr. The Lepchas call this Palm "Simong koong;" they procure a coarse sago-like starch from the trunk.

Tribus II. LEPIDOCARYNEÆ.

CALAMUS, *Linn.*

Sect. I. COLEOSPATHES.

a. Erectæ.

1. C. SCHIZOSPATHUS, *Griff. Calcutta Journ. of Nat. Hist.* v. p. 32; *Palms of British East India*, p. 41, tab. 187. Caudice arborescente, nodis approximatis, vaginis basi auriculatis; aculeis vaginæ verticillatis, compressis, deflexis, setis acutis rigidis interspersis; auriculis laxis, margine ruptis, extus densissime setoso-spinosis; petiolo marginibus et dorso spinis solitariis ternis vel quaternis interdum verticillatis armatis; pinnis æquidistantibus, lineari-lanceolatis, supra

carinatis; spadice abbreviato; spathis inferioribus verticillatis spinosis, superioribus varie fissis et fibroso-laceris; spathis ramorum brevibus, glabris; ramis inferioribus approximatis decompositis, superioribus remotis simplicibus; floribus distantibus; baccis ellipsoideis, apice mammillatis; squamis profunde sulcatis.

Hab. In præruptis siccis vallium fluminum Teesta et Rungeet dictorum, ad altitudinem 500–1000 ped.

Caudex erectus, nudus, annulatus, 5–10-pedalis, 15 uncias in circumductu. *Internodia* 6–8-uncialia. *Vaginæ* spinosæ, furfuraceæ. *Aculei* vaginales nigri, 1–1½ unc. longi. *Folia* 8–12 pedes longa. *Petiolus* erectus, rigidus, 4–5 pedes longus; aculei petiolares pallide aurei, apice nigri. *Pinnæ* 1–2 ped. longæ, ad insertionem plicatæ, carina et nervis duobus supra et subtus setigeræ. *Spadices* suberecti, in fructu nutantes, basi compressi, 2–4-pedales. *Spatha* inferior 2 ped. longa, dorso verticillatim spinosa; superiores 3–6 unc. longæ, aculeatæ. *Rami* decompositi 6–10 unc. longi; rami simplices breviores. *Baccæ* 1 unc. longæ. *Squamæ* rhomboideæ, uninerviæ, marginibus nigris.

This Zalacca-like *Calamus* is found on the steep northern slopes of valleys where micaceous shale abounds. It is called "Rōng" by the Lepchas. *C. erectus* of Roxb., from Silhet, and perhaps from Chittagong, is a nearly allied species; but its ripe fruits are nearly half as large again as those of *C. schizospathus*. I possess ripe fruits of *C. schizospathus*, and have raised young plants in the Botanical Gardens.

β. *Scandentes.*

† *Rachi non producta, cirris vaginalibus (loris) scandentes.*

2. C. FLAGELLUM, *Griff. Palms of British East India*, p. 48.

Hab. Common in most of the valleys of Sikkim from the level of the plains to 3500 feet above the sea.

This cane, the "Reem" of the Lepchas, is by far the commonest *Calamus* in Sikkim. Its canes are soft and useless. It reaches the tops of the highest trees by means of the powerful whip-like prolongations from the sheaths of the leaves.

3. C. LEPTOSPADIX, *Griff. Calcutta Journ. of Nat. Hist.* v. p. 49; *Palms of British East India*, p. 60, tab. 194.

Hab. In moist places in tropical valleys, from the level of the plains to 2000 feet above the sea.

This species occurs in most of the deep valleys of the outer ranges of the Sikkim Himalaya, and extends into the interior along the course of the large rivers and their tributaries. It is somewhat gregarious in its habit. The long slender stems, when lying on the ground, send out short leafy shoots from their joints and form a thicket of prickly leaves. The flowering extremities of these prostrate stems ascend the trees by the assistance of the strongly barbed straight tendrils springing from the sheaths of the leaves. The canes are soft and useless. The Lepchas call this species "Lat."

4. C. MONTANUS, *T. Anders.* Vaginis cylindricis, a basi frondium carinatis, spinis rectis patentibus dense obtectis; frondibus brevibus, petiolatis; rachi glabra, subtus uncinata, marginibus spinosis; pinnis inferioribus lanceolatis, superioribus ovato-lanceolatis, plurinerviis, utrinque glabris, marginibus interdum inermibus, raro setulosis; pinnis alternis vel oppositis, paribus inæqualiter distantibus; spadicibus elongatis, spatha inferiore tubulosa compressa marginibus uncinatis, spathis superioribus non compressis inermibus; ramis (spadicis) brevibus crassis armatis, fœmineis alternis, recurvis; baccis oblique ovatis, apice obtuse umbonatis.

Hab. In sylvis temperatis, supra arbores alte scandens, ad altitudinem 4000–6000 ped. Palma loris aculeatis alte scandens.

Caudex nudus, gracilis, crassitudine pennæ cygni; junior cum vaginis frondium 1½–2 unc. in diametro. *Vaginæ* spinosissimæ, furfure purpureo et argenteo obtectæ; spinæ rigidæ, patentes, compressæ, rectæ, lanceolatæ, supra convexæ, plerumque simplices, interdum bifidæ. *Petioli* dense spinosi; spinæ variabiles, plerumque rectæ simplices, raro recurvæ et bifidæ. *Rachis* glabra, frondium juniorum furfuracea. *Pinnæ* basi plicatæ, supra convexæ, plurinerviæ, marginibus exceptis setosæ, 10–16 unc. longæ, 2–3 unc. latæ. *Lora* ex apice vaginarum orientia, 10–12-pedalia, apice filiformia, aculeata; spathæ (lori) inferiores compressæ, aculeis binis vel ternis reflexis sparse armatæ, spathis superioribus cylindricis. *Spadix* 4–6-pedalis, infra rigidus, erectus, apice filiformis, sterilis, aculeatus. *Spatha* inferior extus furfuracea, dense spinoso-aculeata, 1-pedalis; superior viridis, sparse aculeata, ore laxa, rupta, 4–9 unc. longa. *Baccæ* magnitudine glandis querci, immaturæ fulvæ, maturæ rubræ, basi bracteis et bracteolis persistentibus suffultæ.

This cane, the "Rue" of the Lepchas, is the most valuable one in Sikkim, where it is used for various purposes. The light but strong suspension-bridges by which the large rivers of Sikkim are crossed are made of it. It supplies the strongest ropes for dragging logs of wood from the forests and for securing the heavy loads which the powerful Bhotea porters carry slung from bamboo poles.

The most durable baskets and the cane-work of chairs are manufactured from the split stems. Walking-sticks and riding-canes, prepared from this species, are exported from the Darjeeling district in considerable quantity. This *Calamus* has now become scarce in consequence of the great demand for it and the recklessness with which it has been cut. Plants of it are very rare in the neighbourhood of Darjeeling; and, indeed, it is found abundantly only in the dense subtropical forests of the Sitong range, and on Tonglo, near the sources of the Little Rungeet. This species extends up the deep valley of the Great Rungeet to the base of Kunchinjunga.

†† *Rachi longe producta, cirris vaginalibus nullis.*

5. **C. MACRACANTHUS**, *T. Anders.* Vaginis spinis magnis compressis paucis armatis (spinis solitariis vel geminis), late lanceolatis, compressis, deflexis; foliis breviter petiolatis; petiolo basi gibbo et corrugato, supra plano, subtus convexo, marginibus armatis; rachi utrinque convexa, marginibus et dorso aculeatis; flagello elongato, rotundo, verticillatim aculeato; pinnis geminatim alternis, lanceolatis, longe acuminatis, apice subsetosis, serratis, plurinerviis, nervis utrinque esetosis; spadicibus erectis, ramis nutantibus; spathis brevibus, tubulosis, subcompressis, ad apicem aculeatis, extus leviter furfuraceis; spathis ramorum brevissimis, subinfundibuliformibus, laxis, glabris, ore ciliato; spicis masculis dense imbricatis; bracteis et bracteolis margine purpureo squamosis; antheris elongatis, linearibus, sagittatis, ovaria rudimentaria superantibus.

Hab. In valle fluminis Teesta prope rivulum Rayem dictum, ad altitudinem 500 ped. Palma supra arbores altas scandens.

Caudex 100–200-pedalis, gracilis, digiti humani crassitie, cum vaginis frondium 4 uncias in circumductu. *Vaginæ* glabræ, virides. *Spinæ* vaginales 4–10, flexiles, basi glabræ virides, apice fulvæ, deflexæ, 1–2 unc. longæ, juniores vaginæ adpressæ nigræ. *Frondes* cum flagello 10–15-pedales. *Pinnæ* 1–2-pedales, 2½–3 unc. latæ. *Spadices* supra petiolum orientes, erecti, 3–5-pedales; rami 1 ped. longi. *Spathæ* apice ruptæ, persistentes, 4 unc. longæ; spathæ ramorum brevissimæ, teneræ, ¾ unc. longæ. *Spicæ* masculinæ 1½–2 unc. longæ. *Bracteæ* ovatæ, concavæ, margine purpureæ. *Squamæ* apice acutæ.

This *Calamus* is found in Sikkim only in the valley of the Teesta, about four miles from the plains. It is known to the Lepchas living near the Teesta by two distinct names, "Ruebee" and "Greem." The canes are thick and strong, and of great length. I have seen this species in the valleys of the outer hills of Bhotan between the Teesta and the Tchail.

6. C. INERMIS, *T. Anders.* Vaginis cylindricis, glabris, inermibus, ad insertionem petioli gibbis; ligula parva, membranacea; petiolo supra plano, subtus convexo, marginibus armatis; rachi convexa, demum obtuse tetragona, subtus aculeis rigidis reflexis solitariis vel verticillatis armata; flagello elongato, aculeis uncinatis reflexis verticillatis obtecto; pinnis solitariis vel fasciculatis, fasciculis binatis ternatisve, alternis vel suboppositis, lineari-lanceolatis, utrinque glabris, apice longe aristatis; spadicibus fœmineis axillaribus vel supraaxillaribus, suberectis, ramis flexuosis; spathis inferioribus tubulosis, compressis, sparse armatis, ore obliquo integro, superioribus rotundis carinatis; spicis flexuosis, glabris; floribus approximatis, solitariis; fructibus immaturis ovatis, apice et basi mammillatis, calyce urceolato persistente suffultis.

Hab. In vallibus humidis, calidis, præsertim jugorum exteriorum, ad altitudinem 1000–2000 pedum.

Caudex flagellis aculeatis extensis alte scandens, cum vaginis frondium persistentibus 3 pollices crassus, nudus 2 pollices. *Vaginæ* veteres albido marmoratæ, non furfuraceæ. *Rachis* (cum flagello) 16–20 pedes longa, plus minus fusco-furfuracea. *Pinnæ* lineari-lanceolatæ, apice acuminatæ et longe aristatæ, utrinque glaberrimæ, 1½–2 ped. longæ, 2–2¼ unc. latæ, supra venis tribus setigeris notatæ. *Setæ* minutæ, adpressæ. *Spadices* fœminei 2–4 pedes longi; rami alterni, suberecti vel patentes, 1–1½ pedem longi. *Spicæ* recurvæ, multifloræ, 2–5 unc. longæ.

The canes of this Palm are used for walking-sticks, and sometimes in the construction of cane suspension-bridges. The Lepcha name for this species is "Brool."

Sect. II. CYMBOSPATHES.

7. C. JENKINSIANUS, *Griff. Calcutta Journ. of Nat. Hist.* v. p. 81; *Palms of British East India,* p. 89.—Dæmonorops Jenkinsianus, *Mart. Palm.* ii. p. 227, tab. Z. xvii. f. 5, et Z. xxi. f. 1.

Hab. In the dense marshy forests of the Terai.

This species abounds in the Dhulka Jhar, in the Terai. I found it bearing ripe seed in December. Its canes are exported to the Dinagepur and Maldah districts.

PLECTOCOMIA, *Mart.*

P. HIMALAYANA, *Griff. in Calcutta Journal of Natural History,* v. p. 100; *Palms of British East India,* p. 108, tab. 219. Vaginis tubulosis, furfuraceis, spinis setiformibus verticillatim armatis; petiolo basi plano, inermi vel marginibus aculeatis; rachi furfuracea, aculeis validis recurvis binis vel pluribus basi confluentibus; flagello gracili, dense aculeato; pinnis laxe ternatim vel binatim fasciculatis, superioribus solitariis, alternis, lineari-lanceolatis, apice longe acuminatis et aristatis, basi conduplicatis, 5-veniis, marginibus adpresse spinoso-setosis, utrinque viridibus; spadicibus terminalibus, erectis, ramis nutantibus, ferrugineo-furfuraceis; spathis conduplicatis, subcoriaceis, ferrugineo-tomentosis, raro glabris, apice integris, ore oblique acuminato; spicis solitariis, brevibus, flexuosis, 3–7-floris, spathulis laxis, subdistichis, rhomboideis, apice obcuneatis acutis, marginibus infra apicem revolutis, extus ferrugineo-tomentosis, intus glabris; floribus masculis setis tribus suffultis; calycibus infra medium tripartitis, cupuliformibus, laciniis glabris in setam desinentibus; fructibus subglobosis, depressis, basi calyce et corolla persistentibus suffultis, stylis tribus siccis rostratis; squamis adpressis, fimbriatis, non villosis.

Hab. In sylvis temperatis, præsertim lauretis, in arbores alte scandens, 4000–7000 pedum altitudinem.

Palma flagellis aculeatis scandens. *Caudex* nudus, 1 unc. diametro. *Frondes* cum flagello 6–8 pedes longæ. *Pinnæ* glabræ, 12–16 unc. longæ, 1–1½ unc. latæ. *Spadix* fœmineus 5–6 ped. longus; rami alterni, 6–9 unc. distantes, penduli, 2–3 ped. longi. *Spathæ* 2–4 unc. longæ. *Bacca* ferruginea, magnitudine glandis Querci.

I do not think that *Plectocomia Assamica*, Griff., and *P. Khasiyana*, Griff., can be united with this species, as doubtfully suggested by Sir W. Hooker (vide Bot. Mag. tab. 5105). I have seen authentic dried specimens of all these species as well as living plants of *P. Assamica* and *P. Himalayana*; the Sikkim species is certainly distinct from the Assam one. The small species of *Plectocomia* which Sir W. Hooker referred to in a foot-note (*loc. cit.*) as having been detected in Sikkim by Dr. Hooker, and specimens of which have been distributed from Kew under the name of *P. montana*, Griff., is apparently *P. Himalayana*, Griff.

P. Assamica and *P. Khasiyana* are identical; and the older name *P. Assamica*, Griff., should be adopted. *P. Assamica*, Griff., is easily distinguished from *P. Himalayana*, Griff., by having much broader pinnæ, which are very glaucous on the under surface (those of *P. Himalayana* are green on both sides), by larger spadices, whose branches are covered with very rusty tomentum. The fruits of *P. Assamica* are much larger and more tomentose than those of *P. Himalayana*, whose fruits are small, much flattened from the apex, with glaucous scales with fimbriated margins.

This is the most abundant species of rattan in Sikkim. It occurs gregariously in all moist forests, from 4000 to 7000 feet above the sea, and penetrates into the interior even to the base

of Kunchinjunga. The canes, though very pliable, are soft and useless. The Lepcha name for this species is "Runool."

Tribus III. CORYPHINEÆ.

LIVISTONA, *R. Br.*

L. JENKINSIANA, *Griff. Calcutta Journ. of Nat. Hist.* v. p. 334; *Palms of British East India*, p. 128, tab. 226 A, B.

Hab. In the moist tropical valleys of Sikkim, especially of the outer ranges.

This is a scarce Palm in Sikkim; I have seen it only in the valley of the Teesta and in the deep ravines near Sitong, the loftiest mountain of the outer ranges of Sikkim. This Palm is well known to the Lepchas, who call it "Tulac-Myom."

LICUALA, *Thunb.*

L. PELTATA, *Roxb. Fl. Ind.* ii. p. 179; *Griff. Palms of British East India*, p. 120, tab. 222; *Mart. Palm.* ii. p. 234, tab. 134–162.

Hab. In the outer valleys of Sikkim, *Hortulani hort. botan. Saharunporensis.*

This Palm has been found in Sikkim only by collectors from the Botanical Garden, Saharunpore; specimens procured by them exist in the Calcutta Herbarium. It is quite unknown to the Lepchas.

PHŒNIX, *Linn.*

1. P. ACAULIS, *Roxb. Hort. Bengal.* p. 73; *Fl. Ind.* iii. p. 783; *Griff. Palms of British East India*, p. 137, tab. 228.

Hab. In dry tropical forests of Sal (*Shorea robusta*) and *Pinus longifolia*, in the valleys of the Great Rungeet and the Teesta.

This Palm is called "Schap" by the Lepchas; they eat its ripe fruits, which, although very astringent, are not unpleasant to the taste.

2. P. RUPICOLA, *T. Anders.* Caudice elato, brevi; frondibus elongatis, eleganter nutantibus, petiolo compresso; rachi trigona, compressa; pinnis flaccidis, lineari-ensiformibus, acuminatis, alternis vel suboppositis, non fasciculatis, basi conduplicatis, supra basin planis; spadicibus fœmineis suberectis, compressis, glabris; spathis spadice triplo vel quadruplo brevioribus, lanceolatis, coriaceis, furfuraceis; spicis terminalibus, fasciculatis, glabris, sinuosis; fructibus oblongis, glabris, apice mucronulatis, basi obtusis, calyce et corolla suffultis; pulpa sparsa; seminibus lævibus, embryone dorsali.

Hab. In rupibus præruptis siccis in valle fluminis Teesta ad altit. 400–1500 ped.

Palma gracilis. *Caudex* solitarius, 15–20-pedalis, diametro 8 pollicum.

Folia fere 10-pedalia. *Pinnæ* $1\frac{1}{2}$-pedales, utrinque virides, nitidæ, $\frac{1}{4}$–1 unc. latæ. *Spadix* fœmineus 3–4-pedalis, $1\frac{1}{2}$ unc. latus, glaber, compressus, viridis. *Spicæ* erectæ, 1 pedem longæ. *Spathæ* 1 pedem longæ, $2\frac{1}{2}$ unc. latæ, erectæ, fulvæ. *Fructus* $\frac{3}{4}$ unc. longus, nitidus, flavus.

This species is distinguished from all others of the genus by its long slender stems without adherent petioles, except immediately under the old fronds, by the soft delicate foliage, like the leaves of the Cocoa-nut, and the elongated, much-flattened spadices, bearing a few fasciculated spikes on the sharp edges near the apex. I have seen this Palm only on the steep (almost inaccessible) sandstone cliffs at the exit of the Teesta from the hills into the plains. The Lepchas are apparently unacquainted with this Palm; but those to whom I showed it called it "Schap," the name given to *Phœnix acaulis*.

Griffith apparently found this species in Bhotan and in the Mishmi hills; but he has not named it, and has given only a meagre description of the fronds. This Palm is evidently referred to in the 'Journal of Travels,' at p. 46, as a "*Phœnicoidea*," discovered at Laee Pani in the Mishmi hills; and at p. 200 of the 'Journal of the Mission under command of Captain Pemberton to Bootan,' the plant is styled "an elegant Palm-tree, *habitu Cocos*," abounding on the higher precipices in the valley of the Duranga, near Dewangiri. A short description of the fronds is given at p. 205; and the height of the Palm is said to be that of a moderate Areca.

Note by Dr. T. Thomson.

The species of *Calamus* collected by Dr. Hooker in Sikkim were distributed without names, but with numbers. It may be convenient to indicate the names given to them in Dr. Anderson's paper.

Calamus No. 3=C. montanus, *T. And.*
6=C. inermis, *T. And.*
9=C. leptospadix, *Griff.*
Calamus No. 10=C. schizospathus, *Griff.*
11=C. flagellum, *Griff.*

On Branched Palms in Southern India.

By John Shortt, M.D., F.L.S., &c.

[Read June 18, 1868.]

The most extensively distributed Palms in Southern India are the Palmyra, or "*Borassus flabelliformis*," and the Cocoa-nut, or "*Cocos nucifera*;" but of the several genera, the "*Hyphæne Thebaica*," or Doum-palm, alone has a branched stem, the division being dichotomous or in pairs; but there are exceptions to the general rule in the case of the Palmyra and Cocoa-nut, which are sometimes found with branches. Since the subject first attracted my attention, some two years ago, I have been searching for these during my peregrinations over Southern India, in connexion with my own immediate work; and in that time I have seen some million of Palm-trees, both on the coast and some hundreds of miles inland; and neither my own researches nor the results of my inquiries have enabled me to trace more than six of the Palmyra and two of the Cocoa-nut with branches. The latter I have not seen, but have received drawings of them from my friend Dr. Pulney Andy.

In the Palmyra the branching is irregular; but in the Cocoa-nut the tendency to division in pairs exists. Twin plants from the Palmyra are very common all over this portion of India; but such an occurrence in the Cocoa-nut is a variety. I have seen but one instance of it, and that was in my own garden at Chingleput; and a couple of hundred yards from it, beyond my compound, a twin Palmyra of the same age was found growing.

Since this paper was written, I observe, from a late number of the 'Madras Times,' that in a horticultural show the other day at Travancore a Cocoa-nut was exhibited with five or six shoots growing out of a single root. At the same time a plant of the Areka Palm was also said to be exhibited having from seven to nine heads; this is also an exception to the rule.

The following are the localities in which these branched Palms may be seen:—

1. A few miles from Masulipatam, on the road to Bintrinully, a Palmyra tree existed with twelve branches. During the last cyclone ten of these were broken; of the remaining two, one has withered, the other exists; seven of the broken branches are lying close by, and three stems have been washed away to some distance.

2. At Paulghaut, about three miles from the town, on the Cormbutne road, and about half a mile from the road itself, exists a branched Palmyra. It is a twin plant, and one of the two has six branches.

3. At Madara, on the northern bank of the river Vegay, there is a Palmyra tree with nine branches; one is broken, and the other eight exist; this is a male tree, shown in the accompanying woodcut.

4. At Ramnad, on the bank of the river Vegay, is to be seen

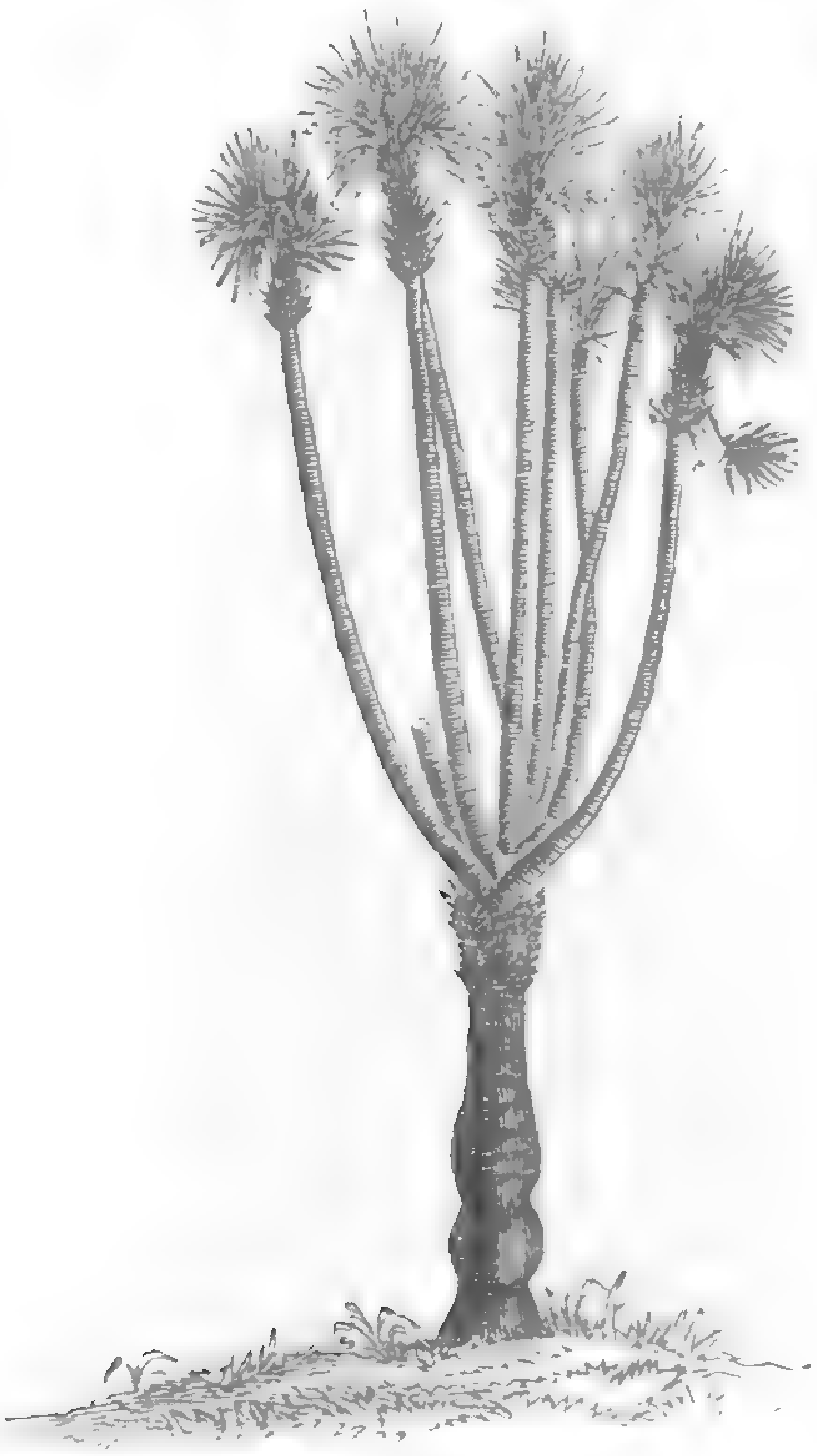
a Palmyra tree with four well-formed branches of equal height; below the division the stem is covered with numerous other shoots of different sizes.

5. On the road to Chellenubrum from Manargudi, I am told, a Palmyra exists with branches, which I have not seen.

6. A Palmyra tree, from Travancore, with five branches, sent by Dr. Pulney Andy.

7. Two branched Cocoa-nut-trees, from Travancore, also sent by Dr. Pulney Andy.

Dr. Pulney Andy thinks that the Palm weevil, *Calandra palmarum*, has something to do in the branching of the Cocoa-nut: as it perforates the leaf-bud, the original becomes diverted to one side, and, he thinks, this in a measure gives occasion for a second shoot forming. This may be possible; but it requires further observation and research to determine the question.



In the genus *Phœnix*, the *Phœnix acaulis*, Buch, is common to all the low hill-ranges in Southern India, to the height of 6000 feet above sea-level. I have seen it on the Shewanys, Kotagherry, and the Pulney Hills, where it grows commonly and luxuriantly into a bush, caused by numerous suckers thrown out around it, something like the plantain. I have counted as many as a dozen suckers around the parent stem; and, with one exception (on the Pulneys, where a plant had attained the height of 8 feet), the stipe never exceeded the height of 2 or 3 feet; and in the exceptional instance where it had attained 8 feet, there were no suckers around the parent stem. The natives eat the fruit, and are partial to it. The fronds are also made use of in various ways, but not to the same extent as the *Phœnix sylvestris* and *Phœnix dactylifera*.

A monstrosity, if I may so term it, has been observed as occurring in a Cocoa-nut-Palm, in which, from one of the flowers on the spadix, a shoot of spring leaves is thrown out. There is a slight tendency to fructification from the flower, and then it is converted into spring leaves, apparently forming a young shoot. This specimen was taken from a Cocoa nut-tree in the province of Travancore. The plant is of the usual size of an ordinary Cocoa-nut-tree; but it never puts forth well-developed fruit. On the contrary, the flowers terminate in vernal leaves; thus, at an average, each spadix or branch bears about thirty to forty such shoots at a time. The leaves are generally considered by botanists homologues of the flower, although their functions are different, the former being engaged in the conversion and assimilation of food, whilst the latter takes on the office of reproduction, but the type of all being the leaf. This frequently occurs in the Mango-tree, where, from some inherent cause, the flowers fail to show, and their place is taken up by the pushing forth of numerous leaves.

Plants, we know, require a period of rest to form flowers; and this is obtained by the cessation of the action of the leaves and roots for a time. During this period the vegetative activity of the sap is directed to the formation of flower-buds; but should this rest not occur, it continues to produce new leaves and roots in the place of flowers. Thus the absence of rain proves sometimes beneficial in arresting the formation of new leaves and roots; and this favours the production of flowers.

Flora of the Húshiarpur District of the Punjab.

By J. E. T. AITCHISON, M.D., F.L.S., &c.

[Read June 18, 1868.]

THE district of Húshiarpur, in the Punjab, is of a lozenge-shape, and extends from the river Sutlej to the Beas in a north-westerly direction, being bounded on the east and north by the Purwain range of hills, and on the west and south by the Jalinder district. The physical formation of the district naturally divides it, for description, into four parts, viz.:—

1. The Plains.
2. The Naree hills.
3. The Dhún of the Sohan rivers.
4. The Purwain hills.

The cantonments of Húshiarpur lie in N. lat. 31° 32′, and W. long. 75° 57′, at an elevation of 1070 feet above the sea-level, and about five miles from the base of the Naree hills.

The Naree or lower range of hills extends across the district in a north-west direction, from overhanging the Sutlej to within six miles or so of the Beas, where it breaks up into plateaux with numerous ravines. This range reaches an altitude of 2200 feet at the Pandu station. The Pamran station, near Naree, is 2047 feet.

The Dhún of the Sohan rivers lies between the Naree and Purwain ranges, and is from four to six miles in width; through it run two streams, both called "Sohan:" that which joins the Sutlej occupies fully three-fourths of the Dhún; the other, that joins the Beas, has a much shorter course, scarcely occupying one-fourth of the Dhún. Between the sources of these two streams there is so very little difference in the lie of the land that the natives affirm that over a large tract of land the streams occasionally run either way.

The temple of Úna, situated in the Dhún, is 1329 feet above the sea-level.

The Purwain or higher range runs from the Sutlej to the Beas in a direction somewhat parallel to that of the Naree hills. At Kullowah (or Kullu) Station the range reaches 3065 feet above the sea-level. Solasinghi Station, which is not, however, in this district, is 3820 feet in elevation. The southern side only of this range is included in the Húshiarpur district.

The Flora.—From the whole length of the Naree hills a large drainage of water is thrown into the plains of Húshiarpur, which spreads itself out into immensely broad but shallow streams called "Chos;" these, before they have gone over twelve miles of country, gradually become absorbed by the thirsty land, leaving behind them, however, large deposits of sand and rich alluvia.

Thus the plains are well supplied with water obtainable at from ten to twelve feet from the surface. The humidity thus created gives a type of vegetation more analogous with that of the "Upper Gangetic Plain" about Saharanpur than of the Punjab.

What one is most struck with on entering the district from Jalinder, are the large groves of Mango, showing splendid and valuable timber, and on all sides the general abundance of wood both natural and cultivated. Around gardens, planted along roads, and in the vicinity of dwellings, there are fine trees of *Acacia Arabica*, *elata*, and *modesta*, *Dalbergia*, *Albizzia*, *Bauhinia variegata* and *purpurea*, *Syzygium*, *Cedrela*, *Moringa*, *Bassia*, *Melia azedarach*, *Bignonia suberosa*, *Cordia*, *Mimusops*, *Millingtonia*, *Pongamia*, and *Tamarix*. In the "English Wood," a natural wood about two miles from the Civil lines, there are:—very fine trees, with excellent timber, of *Dalbergia*, *Albizzia*, *Bombax*, *Ficus glomerata*, *Indica*, and *religiosa*, *Phyllanthus*, *Morus*, *Zizyphus*, *Salix*, besides the smaller trees of *Acacia catechu* and *leucophlœa*, *Butea*, *Casearia*, *Phœnix*, *Flacourtia*, *Ehretia*, *Ægle*; tree shrubs of *Grewia Asiatica* and *oppositifolia*, *Vitex*, *Diospyros montana*, *Rottlera*; climbers and shrubs of *Bauhinia Vahlii*, *Clematis*, *Abrus*, *Capparis horrida*, *Jasminum*, *Celastrus paniculatus*, *Murraya*, *Buddlea*, *Bergera*, *Randia*, with *Solanum verbascifolium* and *Desmodium Gangeticum*. On the outskirts of the wood and in the surrounding fields we find the true Punjab or dry-country forms, viz. *Acacia Arabica*, *A. modesta* (shrubby), *Carissa*, *Zizyphus jujuba* and *nummularia*, *Capparis aphylla*, *Calatropis*, *Justicia*, *Solanum Jacquinii* and *sanctum*.

As further proof of the occurrence of a more south-eastern flora, we find cultivated in gardens, in addition to the usual Punjab fruits, the Custard-apple, Jack-fruit, Shaddock, Averrhoa, Wampi, Mimusops, all bearing fruit well. The Jack-fruit forms a large and handsome tree; and throughout the district here and there an occasional large specimen of the Tamarind is to be met with.

Chavica Roxburghii is cultivated and grows well. *Cissampelos convolvulacea* occurs as a common creeper. The Bamboo and *Pinus longifolia* grow well in gardens. *Argemone* has reached thus far, *viâ* the Jalinder road. *Euphorbia pentagona* is utilized extensively for hedges. *Tillæa pharnaceoides*, Hochst., an Abyssinian type, grows in large quantity in a burial-ground near the "Kutcherry."

Field-cultivation is aided greatly by irrigation from wells.

Sugar-cane is extensively grown, as also Tobacco; the latter is considered very superior in quality. Indigo occasionally is raised as a field-crop, and profitably so. *Carthamus* is not much cultivated. The rest of the crops are similar to those raised near the river banks in the Doabs.

From the dry and arid condition of the part of the district that lies opposite Rúpur, the flora at this most eastern extremity is more strictly Punjab in its type than that of any other part. *Capparis aphylla*, *Calatropis Hamiltoniana*, *Peganum*, and *Alhagi* are in profusion, with *Acacia modesta* and *Gymnosporia*; besides, here alone, on both sides of the river, the Cypress variety of *Acacia Arabica* is to be met with, this being most likely the eastern limit of that Sindhian form, and very nearly that of *Dodonæa* also. On the rocks overhanging the Sutlej *Capparis spinosa* is found, which occurs on similarly situated rocks up the valley as far as Wangtú bridge.

The Naree range of hills is apparently a continuation of the Sewaliks westward. It averages about ten miles in breadth, and opposite Naree, as already stated, attains an elevation of 2047 feet.

The southern aspect of these hills presents a much more barren appearance than the northern. Under 1500 feet the southern face is more or less covered with shrubs of *Carissa*, *Diospyros melanoxylon*, *Flacourtia*, *Gymnosporia*, *Cassia*, *Zizyphus*, *Spathodea*, *Celastrus paniculatus*, *Dodonæa*, *Grislea*, and *Bauhinia racemosa*. On the sunny and dry sides of the valleys *Euphorbia pentagona* is singularly characteristic, with its candelabra-like form. Above 1500 feet we have a stunted forest of *Pinus longifolia*. In valleys on the northern face, but also in sheltered southern localities where moisture can accumulate, we have a tolerably dense vegetation of Bamboo, *Erythrina*, *Mimosa rubricaulis*, *cæsia*, and *catechu*, *Albizzia*, *Rottlera*, *Ehretia lævis*, *Moringa*, *Wendlandia*, *Diospyros cordifolia*, *Morus*, *Vallaris*, *Odina*, *Loranthus*, *Ichnocarpus*, *Deringia*, *Porana paniculata*, *Celsia*, *Colebrookia*, *Hamiltonia*, *Scutellaria*, *Caryopteris*, *Tecoma*, *Calosanthes*, *Gmelina*, *Phyllanthus*, *Casearia*, *Indigofera pulchella*, besides *Melia azedarach*, apparently indigenous, and most of the trees mentioned as being in the "English Wood."

Here, as eastern forms occurring far west, we may note *Gmelina*, *Olax*, *Odina*, *Trichosanthes*, and *Gentiana decemfida*.

Occurring in great profusion amongst the sandstone rocks, and very characteristic, are *Desmodium tiliæfolium*, and *Mucuna pruriens.*

Where the Naree hills break up into plateaux and ravines towards the Beas, on their western extremity, they are covered with a forest consisting nearly entirely of *Bambusa*, which is much resorted to for the feeding of sheep.

Throughout these hills a larger amount of land is cultivated than one at first is led to expect.

In gardens, or, rather, near dwellings, a peculiar kind of lemon, called "Gulgul," is in great abundance.

The Dhún of the Sohan rivers has rich alluvial deposits throughout it, and hence is well cultivated. In addition to the usual cereals and sugar-cane, we have maize, rice, and *Crotalaria junçea*,—the last very extensively. American varieties of cotton have of late been introduced. The millets are little cultivated. *Phœnix sylvestris* is very common. *Butea*, with *Saccharum munja* and *spontaneum*, cover large tracts of waste land, amongst which occasional fine trees of *Cordia* and *Bombax* occur.

A natural wood, called "Gúgrate Geeree," exists on the northern side of the Dhún, at an elevation of about 1300 feet; and in it are to be found some of the finest specimens of *Pinus longifolia* in the district; and in addition to most of the trees already mentioned, we here have *Feronia elephantum*, *Celtis australis*, *Budelia*, *Sponia*, *Cæsalpinia sepinaria*, *Dioscoria* in great abundance, *Dædalacanthus*, besides the eastern types *Ficus cordifolia*, *Xylosma longifolium*, *Engelhardtia*, and *Hiptage madablota.*

In the Garden at Úmb, which is in the Dhún, are some splendid trees of *Morus*, and *Platanus orientalis.* The Walnut has here borne fruit, and so also, it is said, the Apricot, which is rare in the Purwain range; but the trees of the last I did not see.

Tulipa stellata is not uncommon in the fields of the Dhún.

The Purwain range, above 1500 feet, is covered with a large forest of *Pinus longifolia*; but about the middle of the range this form changes, and we gradually find a forest of *Shorea robusta* taking its place, mixed up with trees of *Terminalia bellerica* and *chebula*, and *Bombax*, all showing splendid timber, besides *Michelia*, *Kydia*, *Pentaptera*, *Engelhardtia*, *Hymenodictyon*, *Nauclea*, *Bassia*, *Ehretia serrata*, *Bradleia*, *Elæodendron*, and *Æchmanthera*—this forest constituting that which is usually found at the base of the Himalaya, between the mountains and the plains. Here we have the western limit of the Sal (*Shorea*).

Helinus occurs as an abundant creeper on the face of sandstone rocks.

Jatropha curcas is a characteristic road-side shrub on the highest part of the range, as also *Ficus cunea* on the embankments of the road and ledges of rock.

Rubus flavus, a *Bœhmeria*, and a Fern (not found in the plains) occur near water in the forest.

Throughout these hills there is not much cultivation. Tea has been attempted; but the soil seems to be too dry.

In conclusion, I would beg to thank Dr. T. Thomson for the great trouble he has taken in assisting me to name my collection of plants both for this paper and the one on Lahul, that I laid before the Society some time ago.

Characters of a new Genus consisting of two Species of Parasitic *Gentianeæ*. By ASA GRAY, F. Hon. Memb. L.S.

[Read November 5, 1868.]

ONE of the two little plants here described was detected, between twenty-five and thirty years ago, upon one of the Mangs or Mangsi Islands, north of the Ladrones, by the naturalists of the American South-Pacific Exploring Expedition under Commodore Wilkes. The other and very nearly related species was found in Java by the late Mr. Lobb, and the specimens are in the Hookerian herbarium. They are interesting chiefly from the fact that the parasitic *Gentianeæ* hitherto known are all American. The *Gentianeæ* generally recognized as root-parasitic are all Tropical-American, and constitute the genus *Voyria* of Aublet, along with the sections designated by Grisebach, which Miquel has, perhaps on insufficient grounds, proposed to distinguish as genera. It is likely that the two little plants of the Eastern United States which compose the genus *Bartonia* of Muhlenberg (*Centaurella*, Michx.) are likewise parasitic, being leafless and of a yellowish hue; and *Obolaria*, of the same region, may be suspected to be partially parasitic, after the manner of certain *Scrophularineæ*. Both these genera, I may remark, were considered anomalous from having the whole parietes of the ovary ovuliferous, until it was ascertained that many Gentians, and notably those of the United States, had the same peculiarity.

EOPHYLON, nov. gen. *Gentianearum parasiticarum*.

Calyx 4-fidus, lobis triangulari-ovatis acutatis æstivatione imbri-

catis. Corolla 4-partita, persistens, segmentis angustis æstivatione convolutis? Stamina 4, summo tubo brevi inserta; filamenta subulata; antheræ innatæ, lineari-oblongæ, connectivo evanido uniloculares, apice foramine unico dehiscentes. Ovarium globosum, placentis 2 latis multiovulatis axi coalitis fere impletum. Stylus elongatus, persistens; stigma capitatum seu capitellatum, leviter bisulcum. Pericarpium tenue membranaceum, vix dehiscens, semiseptis evanidis uniloculare. Semina in placentis, ut videtur, subcarnosis innumera, semiobovata, basi attenuata; testa reticulata. (Ludit pistillo trimero.)

Herbulæ oceanicæ, bi- triunciales, *Voyriæ* facie, antheris fere *Chironiearum*, uni- paucifloræ, squamis phyllinis ovatis parvis præditæ, floribus albidis.

1. E. TENELLUM. Caule gracillimo unifloro; corollæ profunde 4-partitæ segmentis basi contractis quasi unguiculatis.

Hab. Mangs or Mangsi Islands, north of the Ladrones; coll. Amer. S. Pacific Exped. under Comm. Wilkes.

2. E. LOBBII. Caule validiore nunc ramoso 1–5-floro; corollæ segmentis lineari-oblongis tubo triplo longioribus.

Hab. Java, *Lobb*; in herb. Hook.

These new Oriental or Oceanic representatives of the group, very like *Voyrias* in aspect, except that the tube of the corolla is short and inconspicuous, must, however, be referred to a different division of the Order as arranged by Grisebach, namely, to his subtribe *Chironieæ*; for a principal character of the new genus is that the anthers are not merely destitute of connective, but the two cells are actually confluent into one, which opens at the apex by an ample foramen. As is not unusual in *Chironieæ*, the large placentæ are more or less united in the axis; in one species, and probably in the other as well, the placentæ are early free from all connexion with the parietes of the ovary, except at the base and summit.

The name proposed for the genus, *Eophylon*, refers to the oriental habitat.

Note on the Structure and Affinities of *Parnassia palustris*, L.

By Alfred W. Bennett, M.A., B.Sc., F.L.S.

[Read November 19, 1868.]

The true position of *Parnassia* has been a source of much doubt and variety of opinion among botanists, having been placed by authors of acknowledged repute among Hypericaceæ, Droseraceæ, Saxifragaceæ, and constituting an order by itself, Parnassiaceæ. The chief advocates of its place among the Hypericaceæ were Don and Lindley. It is singular, however, that of the characters which Lindley gives in his 'Vegetable Kingdom' as those by which St. John's Worts may be recognized, viz. the axile placentation, and the polyadelphous stamens, together with the long style, the unequal-sided petals, and the opposite dotted leaves, not one applies to *Parnassia*, the affinity being founded entirely on the exalbuminous seed, and on a fancied analogy between the polyadelphous stamens of *Hypericum* and the glandular scales which constitute the nectary of *Parnassia*. With Droseraceæ, under which order the genus is placed by Babington and most of the older English botanists, the affinities of *Parnassia* consist mainly in the unilocular ovary, terminating in several stigmata, the parietal placentation, the extrorse anthers, and the marcescent petals. Bentham and Oliver unite Droseraceæ with Saxifragaceæ, an alliance not recognized by the older botanists. Without presuming to express an opinion opposed to that held by such high authorities, I may point out the following important differences in structure between *Saxifraga* and *Parnassia*:—In *Saxifraga* the capsule is bilocular, the styles never more than 2, the placentation axile, and the anthers introrse; in *Parnassia* the placentation is parietal (Dr. Hooker finds no signs of any deviation from this structure in any of the Himalayan species he has examined), the capsule is unilocular, the styles 3 to 5, and the anthers extrorse.

In transferring *Parnassia* to Saxifragaceæ, I cannot help doubting whether too much force has not been given to the perigynous character of the stamens, as, if that is insisted on as a material point, *Parnassia* must be entirely removed from *Drosera*, with which genus all botanists seem to agree it has very close relationship, and which has the stamens truly hypogynous, at least in our European species. Indeed a strict carrying out of this test would necessitate the division of *Drosera* itself into widely separated orders; for St.-Hilaire describes Brazilian species of that genus as passing by every grade into a true attachment between the stamens and the calyx, and the same variability occurs also among Violaceæ.

On the difference in the structure of the seeds I do not lay so much stress, as, if their exalbuminous character is to be taken as an essential point, *Parnassia* must either be referred back to Hypericaceæ, with which it has no other affinities, or be hopelessly consigned to the solitary confinement of a separate order. The extrorse stamens are, however, connected with an important physiological function presently to be described. In his 'Genera of North-American Plants,' Prof. Asa Gray describes the anthers of *Parnassia* as introrse, and gives a drawing of *P. Caroliniana* as an illustration. I do not, however, find any other observer to agree with Prof. Gray's observation in this respect, except two American botanists, Dr. Torrey and Mr. Chapman, who have probably borrowed their descriptions from him; nor do any specimens which I have been able to examine of this species confirm any departure in this respect from the ordinary type of the genus.

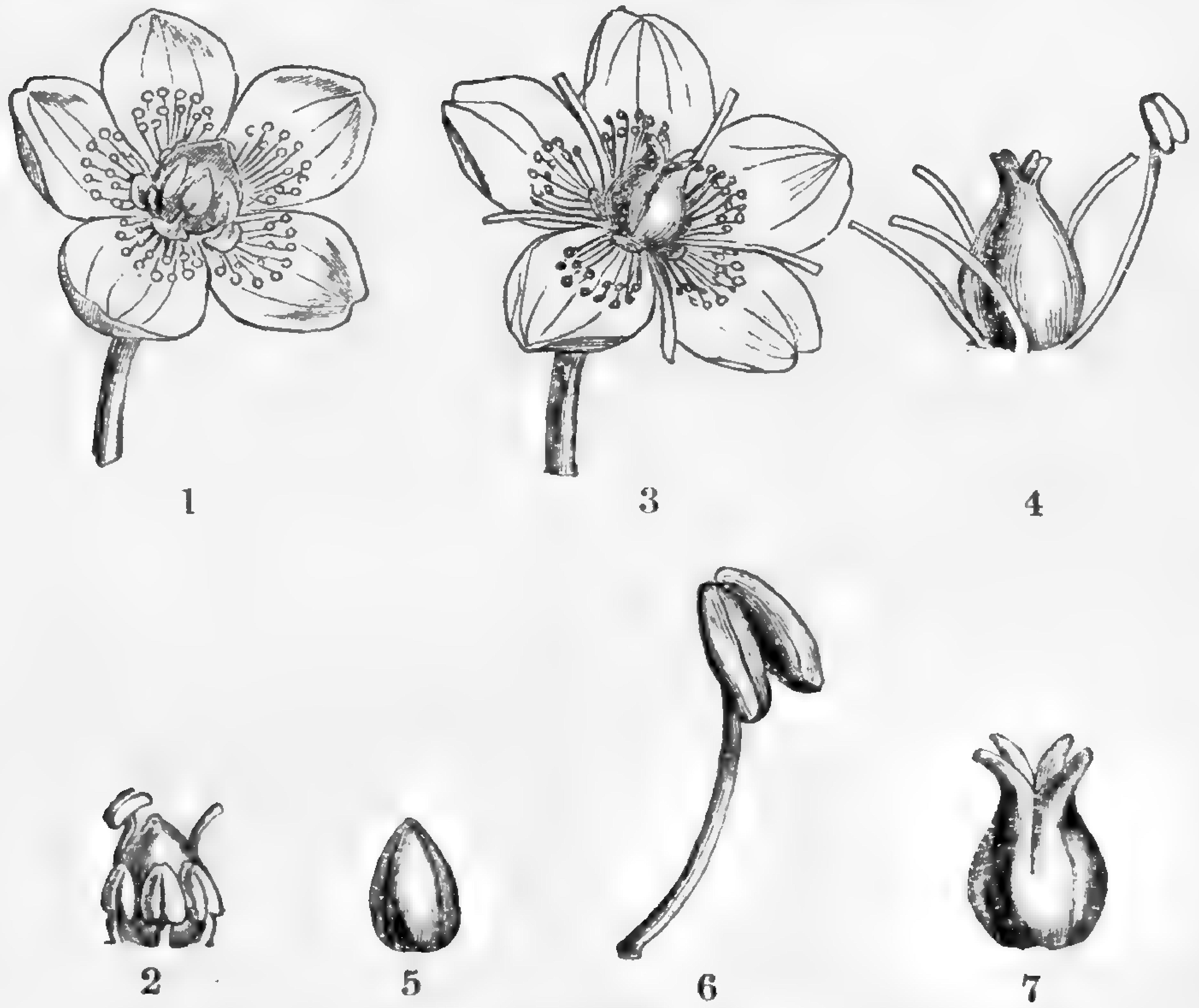
Before pointing out what seem to me the affinities between *Parnassia* and some tropical genera with which it has not been generally associated, a few remarks may not be out of place on the physiological structure of our British species. The true morphological value of the remarkable glandular petaloid scales of *Parnassia* has been a subject of much discussion. The advocates of its affinity with *Hypericum* of course consider these scales to be modified polyadelphous stamens united together at the base. The fact, however, that notwithstanding the countless number of specimens examined by some German botanists, I can find no record of a single flower having ever been gathered in which the glands have reverted into pollen-bearing anthers, seems to me a strong argument against this hypothesis. In certain Himalayan species these scales seem entirely to lose their staminoid appearance, and to be simply bifid or trifid at the apex, or even almost entire. I am rather disposed, on the other hand, to consider them to be a modified inner row of petals, the glands having an unmistakeable function, as we shall presently see, connected with the distribution of the pollen. Dr. Buchenau (Botanische Zeitung, vol. xx. p. 307) goes so far as to view the glands as metamorphosed carpels!, having found a specimen in which they are rolled up in a carpellary fashion. The 4 stigmata present an anomaly in the otherwise quinary arrangement of the parts of the flower. Foreign species, however, present a more symmetrical structure. The drawing of *Parnassia Kotzebui* in Hooker's 'Flora Boreali-americana' clearly indicates 5 stigmata; and Dr. Seemann, in his 'Botany of the Herald,' speaks of frequently gathering both that species and *P. palustris* with 5 stigmata. Prof. Röper also records, in the 'Botanische Zeitung' (vol. x. p. 187), his supreme delight, after inspecting more than a thousand flowers of *P. palustris*, in being at length rewarded by gathering one with 5 stigmata. Dr. Hooker, on the other hand, describes Himalayan species with only 3 stigmata. If, therefore, we are to take the number of stigmata in *Parnassia* as variable from 3 to 5, with 5 as the normal number, as shown by the reversion of *P. palustris*, it will assimilate the genus more closely to *Drosera*, while removing it still further from *Saxifraga*.

The most remarkable feature, however, in the physiology of *Parnassia* is the phenomena attending its fecundation, which I had an opportunity of observing somewhat closely during a stay last summer in Argyleshire. The fullest and most accurate description of these phenomena hitherto published I find in Vaucher's 'Histoire physiologique des Plantes d'Europe,' from which I translate as follows:—"The physiological phenomena which *Parnassia* presents belong chiefly to its fecundation. When the flower is fully open, the filaments, at first very short, suddenly lengthen, and place the anthers on the top of the ovary, so that all the glandular globules, and especially the scale which bears them, and which is covered with little drops of honey, can dissolve the pollen with which they are sprinkled. This operation accomplished, the anther falls and disconnects itself, and the filament resumes its original place. Each of the anthers successively executes the same movement; but those which succeed each other are alternate, and not contiguous, so that the march of the phenomenon is never interrupted. The anthers are extrorse and somewhat lateral; the pollen consequently cannot fall on the stigma, but falls on the nectaries, which are, as it were, smeared with it, and only the emanation from which can, I think, fertilize the stigmata. It would be difficult, at least, to assign any other function than that of the absorption of the pollen to this nectary, so remarkable and so constant in all the species of the genus. What confirms my conjecture is, that the stigmata are entirely invisible while the anthers are discharging their pollen, and that they only begin to display themselves and to expose their papillose tongues at the moment when the emission is accomplished" (vol. i. p. 324). The successive lengthening of the filaments was observed so long ago as by Sir James Edward Smith; and the manner in which this takes place is very remarkable. The increase, to the extent of at least three or four times their original length, must be accomplished in an incredibly short space of time; the adhesion to the ovary is so strong during the whole of this time that they cannot be bent back without breaking them; but as soon as the pollen is discharged, they retire to a horizontal position between the petals, and the anther falls. My own observation does not, however, confirm Vaucher's statement that the lengthening takes place alternately; I have frequently noticed contiguous stamens to follow each other. It will be observed that the movement of the stamens in *Parnassia* presents but little resemblance to the "approach of the stamens to the pistil in pairs," which is described as taking place in certain species of *Saxifraga*; nor does it appear in this latter genus to be accompanied by the simultaneous lengthening of the filament, which serves an important physiological function. Together with this elongation of the filament, and previously to the discharge of the pollen, a singular contraction of the anther takes place; and I have no hesitation in concluding that the arrangement above described is one of the most remarkable provisions of nature yet observed for insuring cross-fertilization; for not only does the anther place itself, at the time of the ripening of the pollen, with its back on the very apex of the pistil, so as completely to close the approach to the ovary, but, as if to make assurance doubly sure, the stigmata are not developed until the whole of the anthers have successively performed this movement and discharged their pollen. The object of the glandular nectaries is now clearly seen, and is not, as Vaucher imagined, the return of the pollen to its own stigma, but to enable insects to carry it away to other flowers in which the stigmata are already expanded. I spent a considerable portion of one of those rainy mornings which in Scotland bring forth such countless clouds of insects, in keeping watch over a field as thickly studded with *Parnassia* as an English hedge-bank with primroses, and scarcely noticed a single flower in which several insects were not regaling themselves on the nectariferous glands—belonging to several species, but mostly a long-legged dipterous fellow, whose long thighs, straddling right across the centre of the flower, could not fail to carry the pollen right on to the expanded stigmata of some other more fully developed flower. Those plants which were in a sufficiently advanced state invariably had the ovary loaded with seeds. It will be understood, from the above description, why I am disposed to lay considerable stress on the extrorse anthers of *Parnassia* as contrasted with the introrse organs of *Saxifraga.*

While investigating the affinities of *Parnassia,* I was struck with the resemblance, in more than one point, between this genus and two others not generally associated with it, principally located in Tropical America, *Sauvagesia* and *Lavradia,* which have also been referred by botanists to a number of different orders, having been variously placed under Cistineæ, Violaceæ, Frankeniaceæ, Elatineæ, Droseraceæ, or, to cut the Gordian knot, have been erected into an order by themselves. The most general view of their correct position may probably be taken to be that adopted by Bentham and Hooker in the 'Genera Plantarum,' where they are ranged under Violaceæ. Here, again, I may be permitted simply to point out the discrepancies which separate them from the typical genera of that order; and in this, as well as in tracing their relationship to *Parnassia,* I am chiefly indebted to the admirable monograph of the two genera contained in St.-Hilaire's 'Histoire des Plantes les plus remarquables du Brésil et du Paraguay.' In *Viola,* then, the corolla is irregular, there is but a single row of petals or stamens, the anthers are turned inwards, frequently united into a ring or tube, and with the connective extended considerably beyond the anther-cells, and the dehiscence of the capsule is loculicidal. In *Sauvagesia,* on the other hand, the corolla is regular, there is a single or double row of inner petals or staminodia, the anthers are turned outwards, entirely distinct, and with the connective not prolonged, and the dehiscence of the capsule is septicidal. The so-called "staminodia" of these genera, which I cannot but look upon as the analogues of the glandular scales of *Parnassia,* are very remarkable. In *Lavradia* they present a single row of petaloid organs, united together into a tube completely enclosing the pistil and the stamens, which are furnished with very short filaments, and closely resemble those of *Parnassia* at an early stage, having the same extrorse dehiscence. In *Sauvagesia,* instead of one, there are two rows of these additional organs; and, what is very remarkable, the exterior has a staminoid, and the interior row a petaloid appearance. The exterior row are described by St.-Hilaire as varying in form in the different species, but always thread-shaped at the base, and thickened upwards to the shape of a club, a nail, or a spade; the inner row consists of 5 distinct petaloid scales, surrounding the generative organs, but not united, as in *Lavradia*, into a tube. Taking these two rows of organs unitedly as constituting the nectary, it would be difficult to consider both the inner and outer row metamorphosed stamens, the inner row appearing never to present an approach to a staminoid form, and the outer row being frequently partially or entirely aborted; and this would seem to confirm the view that the scales of *Parnassia* should be regarded in the light rather of petals than of stamens. I can find no record of any observation of phenomena connected with the stamens of *Sauvagesia* similar to those I have described in *Parnassia*, or identifying, as I should expect would be the case, the functions of the extrorse anthers and nectary of *Sauvagesia* with those of our English genus. In all the species of *Lavradia*, however, the inner corolla is described as purple or rose-coloured, as if for the purpose of attracting insects, while the exterior corolla is generally white.

The most conspicuous structural differences between *Parnassia* and *Sauvagesia* are the 3–5 stigmata and exstipulate leaves of the former, contrasted with the single style and stigma and the remarkable laciniated or fimbriated stipules of the latter genus, together with the difference in their general habit. It will be interesting, therefore, to trace what aberrant forms exist connecting the two. In Hooker and Thomson's 'Præcursores ad floram Indicam' (Journal of the Linnean Society, vol. ii. p. 55), I find that Himalayan *Parnassiæ* are described as "styles 3 or 1," while in *P. tenella*, on which species they remark (p. 79) that, "though it is decidedly the most abnormal species of the genus yet discovered, it is somewhat singular that it does not throw any light on the affinities of the genus," we have the "fimbriated stipules" so characteristic of *Sauvagesia* and *Lavradia*, and the curious scutiform staminodia irresistibly remind one of those of several species of *Sauvagesia*. In *Sauvagesia tenella*, on the other hand, the smallest species of the genus, the slender habit and distant alternate sessile spathulate leaves, together with the partial or entire abortion of the outer row of staminodia, show a marked approach to some of the species of *Parnassia* with foliose scapes, while the stipules, described by St.-Hilaire as very small, are either deciduous or entirely absent in the specimens preserved in the Kew Herbarium.

With the exception of *Sauvagesia erecta*, which spreads into Mexico and the West Indies, and even into Madagascar and Java, these two genera are confined to South America and almost entirely to Brazil, while the less important allied genera of *Schuurmansia* and *Neckia*, presenting the same general features in their structure, belong to the Indian archipelago. Without, therefore, assuming a definite opinion that *Parnassia, Sauvagesia,* and *Lavradia* should be united into the same order, I would venture to suggest whether our pretty little English Grass of Parnassus, so foreign in many respects in its appearance, may not be looked on in some sort as a European and temperate representative of the tropical *Sauvagesiæ* and *Lavradiæ*.



1. Flower of *Parnassia palustris* at the time of opening.
2. Stamen commencing to discharge pollen.
3. Flower with all the stamens discharged.
4. Stamen retiring from pistil; stigmata developed.
5. Pistil at the time of opening of the flower.
6. Stamen discharging pollen (magnified).
7. Pistil after the stamens are discharged.

Note.—Since the above paper was written, some observations on the same subject, by M. Gris, have been published in the 'Comptes Rendus' of the French Academy for Nov. 2nd, 1868. The conclusions at which M. Gris has arrived concur, on almost every point, with those to which I have been led, as far as the physiological structure of *Parnassia* is concerned. That botanist points out that, as long ago as 1793, Sprengel observed that the relative positions of the pistil and stamens in this genus necessitate the hypothesis of fertilization by insect agency. Linnæus, St.-Hilaire, and other botanists have presented different views of the structure of the flower; but a careful series of observations by M. Gris fully confirm in almost every respect the accuracy of Sprengel's description. The points to which M. Gris especially refers as having been lost sight of by most recent writers are, the completely extrorse character of the anthers at the period of their dehiscence, the non-maturity of the stigma until after the whole of the stamens have discharged their pollen, and the fact that the stamens never do "approach the pistil in pairs" (which has been urged as an analogy between *Parnassia* and *Saxifraga*), but that their remarkable elongation is accomplished in close contact with the ovary, which they do not quit till after the discharge of the pollen.

Notes on the Stamens of *Saxifragæ*.

By Mr. Duncan. Commmunicated by J. E. Baker.

[Read November 19, 1868.]

The two species to which the remarks which follow apply are *Saxifraga cæspitosa* and *S. hypnoides*; and, without any modifications of importance, what is true of the stamens of any one of these is true also of the other.

Shortly after the expansion of a flower, the stamens, which are of two lengths and in two rows, lie back to the petals; and in this spreading position they continue until the pollen is almost ready for being shed. The contents of only one anther at any given time are ready for dispersal; and each mature stamen is brought at the right moment into that position which is most favourable for the contents of the anther being emptied on the stigma, by the timely bending inward of the filament. So soon as the pollen is discharged, the stamen slowly retires again, through the unbending of the filament, and takes up its old station close to the petals. Every stamen goes through the same performance, and in doing so observes a regular order: the longer and larger stamens go first, and the shorter and smaller ones proceed afterwards. It may be of interest to notice that the stigma is not always receptive when the first fully-developed anthers begin to discharge.

Notes on a Collection of Plants from the North-east Shore of Lancaster Sound. By G. Dickie, M.D., F.L.S.

[Read November 19, 1868.]

In March 1865 'The Queen,' of Peterhead, commanded by Captain G. Brown, sailed under orders to pass the winter in some part of the Arctic Sea, at the discretion of the commander, in order to capture whales late in autumn and early in spring. Captain Brown determined to winter somewhere in the vicinity of Lancaster Sound, near the "north water" of the whalers.

After various detentions owing to winds and the state of the ice, the vessel was, on the last day of August, laid up for the winter in a deep inlet called in the charts "Bethune Bay," about thirty miles from Cape Horsburgh, which bears E.N.E. from it; the harbour is in N. lat. 74° 44′ 24″, W. long. 76°.

An Aberdeen student, Dr. E. P. Philpotts, had medical charge of the expedition; and to him I am indebted for the materials which form the subject of the following notes.

Explorations by Captain Brown and Dr. Philpotts proved that the land represented in the most recent maps as a peninsula is in reality an island, the eastmost point of which is Cape Horsburgh. This island is separated from the mainland by a channel full of icebergs; the channel on the west is narrow and shallow, its eastern margin being the shore of the said island, and its western an extensive glacier attached to the mainland, and forming a sea-cliff of solid ice.

The island is about thirty miles long, by ten in breadth; the centre is a swampy plain, with numerous streams and lakes, interspersed with ranges of low hills.

On various parts of this inhospitable shore Dr. Philpotts was very assiduous in making collections, from the end of June to the 5th August, 1866, on which day the 'Queen' got free from the ice and proceeded southwards*.

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* A very full and interesting account of the voyage was published by Dr. Philpotts in the 'Peterhead Sentinel,' and afterwards printed for private distribution.

FLOWERING PLANTS.

RANUNCULACEÆ.

Ranunculus nivalis, *L.*

PAPAVERACEÆ.

Papaver nudicaule, *L.*

CRUCIFERÆ.

Cochlearia officinalis, *L.*, var. arctica.

Draba alpina, *L.*, var. glacialis.

CARYOPHYLLACEÆ.

Lychnis apetala, *L.* Rare and very dwarf.

Cerastium alpinum, *L.*

Stellaria longipes, *Goldie.*

S. humifusa, *Rottb.*

Arenaria rubella, *Br.*

ROSACEÆ.

Dryas octopetala, *L.*, var. integrifolia.

Potentilla nivea, *L.*

SAXIFRAGACEÆ.

Saxifraga oppositifolia, *L.*

S. nivalis, *L.*

S. rivularis, *L.*

S. cæspitosa, *L.*

S. cernua, *L.*

S. tricuspidata, *L.*

ERICACEÆ.

Cassiope tetragona, *L.*

VACCINIEÆ.

Vaccinium uliginosum, *L.*

SCROPHULARIACEÆ.

Pedicularis hirsuta, *L.*

POLYGONACEÆ.

Oxyria reniformis, *L.*

Polygonum viviparum, *L.*

EMPETRACEÆ.

Empetrum nigrum, *L.*

AMENTACEÆ.

Salix arctica, *Br.*

S. herbacea, *L.*

MELANTHACEÆ.

Tofieldia palustris, *L.*, var. borealis.

JUNCACEÆ.

Luzula arcuata, *Wahl.*, var. hyperborea.

GRAMINACEÆ.

Alopecurus alpinus, *L.*

Deschampsia alpina, *L.*

Trisetum subspicatum, *P. B.*

Phippsia algida, *Br.*

Dupontia Fischeri, *L.*

Poa laxa, *Hænke.*

P. alpina, *L.*

LYCOPODIACEÆ.

Lycopodium selago, *L.*

MOSSES.

Andreæa petrophila.

Sphagnum acutifolium.

Cynodontium virens, *Hedw.*, var. β.

C. polycarpum, *Ehrh.*

Dicranum fuscescens, *Turn.*

D. elongatum, *Schw.*

Barbula fragilis, *Wils.*

Schistidium apocarpum, *L.*, varr. α, γ, δ.

Grimmia elongata, *Kaulf.*

Rhacomitrium lanuginosum, *Hedw.*

Orthotrichum arcticum, *Schpr.*

Splachnum Wormskioldii, *Hornem.*[*]
Webera cruda, *Schr.*
W. Ludwigii, *Spreng.*
Bryum arcticum, *Br.*
B. purpurascens, *Br.*
B. calophyllum, *Br.*
B. pallens, *Swartz.*
Mnium hymenophylloides, *Hueb.*
Aulacomnion turgidum, *Wahl.*
Timmia Austriaca, *Hedw.*
Pogonatum alpinum, *L.*
Polytrichum piliferum, *Schreb.*
Myurella julacea, *Villars.*
Orthothecium chryseum, *Schw.*
Hypnum Sommerfeltii, *Myr.*
H. fluitans, *Hedw.*
H. reptile, *Michx.*
H. hamulosum, *Br. Eur.*
H. salebrosum, *Hoffm.*
H. splendens, *Hedw.*

HEPATICÆ.

Gymnomitrium concinnatum, *Ca.*
Jungermannia minuta, *Crantz.*
J. setiformis, *Ehr.*
J. barbata, *Schr.*
Ptilidium ciliare, *Nees.*

LICHENS.

Sphærophoron coralloides, *Ach.*
Cladonia deformis, *Hoffm.*
C. pyxidata, *Fries.*
C. gracilis, *Hoffm.*
C. furcata, *Huds.*
C. rangiferina, *Hoffm.*
Thamnolia vermicularis, *Ach.*
Stereocaulon paschale.
Siphula ceratites, *Fr.*
Alectoria ochroleuca, *Nyl.*
Dactylina arctica, *Hook.*
Dufourea madreporiformis, *Ach.*
Cetraria Islandica, *Ach.*
Platysma nivale, *Nyl.*
P. juniperinum, *Nyl.*
Peltigera canina, *Hoffm.*
Solorina crocea, *Ach.*
Parmelia saxatilis, *Ach.*, var. omphalodes.
Umbilicaria hyperborea, *Hoffm.*
U. hirsuta, *DC.*
U. proboscidea, *DC.*, var. arctica.
U. vellea, *Michx.*
Placodium elegans, *DC.*
Lecanora tartarea, *Ach.*
L. subfusca, *Ach.*
L. ventosa, *Ach.*
L. atra, *Huds.*
L. vitellina, *Ach.*
Lecidea petræa, *Ach.*
L. geographica, *Ach.*
L. polytropa, *Ehrh.*

ALGÆ.

Fucus vesiculosus, *L.*
Desmarestia aculeata, *Lamour.*
Dictyosiphon fœniculaceus, *Grev.*
Sphacelaria plumosa, *Lyngb.*
S. arctica, *Harvey.*
Ectocarpus litoralis ? Fragments only.
Rhodomela lycopodioides, *Ag.*
Polysiphonia arctica, *Ag.*
Conferva melagonium, *Web. & Mohr.*

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[*] This was found very abundant and luxuriant among the ruins of Esquimaux huts; the former inhabitants have crossed, years ago, to the south side of Lancaster Sound.

By way of comparison we may take Port Kennedy, more than two degrees further south, where Dr. Walker collected forty-five flowering plants[*]. Dr. Philpotts's species in Bethune Bay and neighbourhood are thirty-five; the following occur in the latter locality which are not in the Port Kennedy list, viz.:—

Stellaria longipes, *Goldie.*
Vaccinium uliginosum, *L.*
Salix herbacea, *L.*
Deschampsia alpina, *L.*
Trisetum subspicatum, *P. B.*
Phippsia algida, *Br.*
Poa alpina, *L.*

There were very few Mosses collected at Port Kennedy; and therefore no comparison can be made.

The species recorded here are thirty-one; and it is worthy of note that of these only five had fruit, and that very sparingly, viz.:—*Cynodontium virens*, *C. polycarpum*, *Orthotrichum arcticum*, *Bryum purpurascens*, and *B. calophyllum*; all these are monœcious. The other monœcious species, without fruit, are *Sphagnum acutifolium*, *Schistidium apocarpum*, *Splachnum Wormskioldii*, *Webera cruda*, *Timmia Austriaca*, *Orthothecium chryseum*, *Hypnum Sommerfeltii*, *H. fluitans*, *H. reptile*, *H. salebrosum*. The remaining sixteen diœcious species were in the same condition; no capsules in any obvious stage were seen. Thirty-one species of Lichens are here recorded; thirty-six were found at Port Kennedy.

Dr. Philpotts made several attempts at dredging; these failed in consequence of ice and currents: the number of Algæ is therefore small; some were found floating, others attached; all, with two exceptions are widely diffused, the only truly northern species being *Sphacelaria arctica* and *Polysiphonia arctica*; the former was discovered by Dr. Lyall at Disco[†], and was also found by Mr. Taylor[‡] in Cumberland Sound; it now appears to range beyond 74° N. lat. Numerous Diatomaceæ occur on Dr. Philpotts's Algæ, and he collected masses from ice-floes consisting of the same microscopic organisms; these, with others from various parts of Davis Straits, may form the subject of a future communication.

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[*] Journal of Linnean Society, vol. v. (Botany) p. 79.

[†] Harvey in 'Nereis Boreali-Americana,' part. iii. p. 124.

[‡] Journal of Linnean Society, Botany, vol. ix. p. 238.

On Chemical Reaction as a Specific Character in Lichens. By W. LAUDER LINDSAY, M.D., F.R.S.E., &c.

[Read November 19, 1868.]

CONTENTS.

1. Summary of observations by Nylander and Leighton on
    - Erythrinic, Chrysophanic, and Usnic } reactions, with their subactions.
2. Criticism on said observations.
3. Summary of author's observations on the reactions of—
    - *a.* Chlorinated lime and soda,
    - *b.* Potash and ammonia,
    - *c.* Iodine.
        - i. Directly, on
            - (*a*) External surface of the thallus or apothecia,
            - (*b*) Their internal tissues.
        - ii. On alcoholic or aqueous decoctions of thallus.

DURING the last few years several Lichenologists* of established reputation have introduced what they are pleased to call "new criteria" or "new chemical tests" in the study of Lichens—chemical characters, in short, for the differential diagnosis of *species*. They have done so, moreover, in language so sanguine, and with assertions so strong, that, if their observations could be substantiated as facts, their generalizations could not fail to be of the utmost importance in systematic Lichenology.

Dr. Nylander, of Paris, led the way, in 1866, by introducing Hypochlorite of Calcium and Hydrate of Potash as new tests of species in certain large and important groups, families, and genera, in the following terms† :—

"These examples are amply sufficient, I think, to point out the *invaluable* aid afforded by chemical reactives in the study of Lichens" (p. 365). "By these examples, which may be *verified with the greatest ease*, I believe that I have sufficiently *established* the *invaluable* assistance which the hypochlorite of lime affords us in the study of Lichens. The least frustule of the thallus is sufficient for the verification, without the microscope, of the beautiful chemical character which distinguishes, even in the very *youngest individual* specimens, the species in which other differences are scarcely visible. The chemical characters have also this advantage (as I have noticed elsewhere in speaking of the utility of the different reactions obtained with iodine as characters of Lichens), that we are guided by the differences manifested through the reaction to search with more attention for organic characters; and, as a general rule, we shall *not fail to find them*" [!] (p. 362). "It is very *easy* to convince ourselves of the importance of this distinctive sign [reaction with hydrate of potash], according to its existence or non-existence in the Lichens which we are studying or determining" (p. 363). "By the presence or absence of this yellow reaction, we can equally distinguish many species in a manner far *easier and more certain* than by the ordinary characters hitherto affixed to them" (p. 364).

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* Their views appear to be supported by Dr. Stenhouse, who wrote me in February 1867, "I quite agree....that much light may be thrown on the *botany* of Lichens by means of *chemical* reaction." I cannot, however, accept the testimony of a *chemist* on a question of *botanical* diagnosis.

† "Hypochlorite of Lime and Hydrate of Potash, two *new Criteria* in the study of Lichens," Journal of the Linnean Society, Botany, vol. ix. p. 358. *Vide* also the 'Flora,' May 12 and 13, 1866; and paper "On two *new chemical tests*" for Lichens, "Notulæ Lichenologicæ" of Leighton, Annals of Natural History, 1866, vol. xviii. p. 169.

The veteran Rev. Mr. Leighton, of Shrewsbury, immediately supported all Nylander's assertions, adding a further means of diagnosing the species of *Cladonia* by the double reaction of hypochlorite of calcium and hydrate of potash, his language of recommendation failing in no respect in enthusiasm or confidence*. Thus he writes, "Dr. Nylander has recently *discovered* two *new* chemical tests or criteria which are likely to prove of *great value* in the study of Lichens, not only in the discrimination of many difficult and closely allied *species*, but also in associating *varieties* with their proper species, and in some instances in defining the affinities of *genera*...... Their usefulness is at once demonstrated and enhanced by the fact that the very smallest frustule is *sufficient to determine* the lichen submitted to them, and that whether in the sterile or fertile state, and even in the *youngest* condition" (p. 169)†. Chemical tests are "most useful and *indispensable* aids as affording confirmatory characters and in discriminating doubtful or externally allied *species*" (p. 440)‡.

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* "On the Examination and Rearrangement of the *Cladoniei* as tested by Hydrate of Potash," Ann. Nat. Hist. 1866, vol. xviii., and "On the *Cladoniei* in the Hookerian Herbarium at Kew [tested by hypochlorite of lime after potash]," Ann. Nat. Hist. 1867, vol. xix.

† "Notulæ Lichenologicæ, No. IX.," Annals of Nat. History, 1866, vol. xviii.

‡ "Not. Lich. No. XVIII.," Ann. Nat. Hist. 1867, vol. xx.

Th. M. Fries has endeavoured in his later works * to apply all the reagents recommended by Nylander and Leighton, including iodine, to the medullary tissue of the *Lecideæ.* Stizenberger has supported Nylander's views †; and there seems at present a general tendency among continental lichenologists to introduce into their descriptions of species the actions of one or all of the reagents which are supposed or asserted to possess such important uses in diagnosis.

Nylander, however, does not limit the usefulness of the chemicals he introduces to the mere diagnosis of *species.* He appears to regard them also, in some instances at least, as *colorimetric tests,*—as, for instance, when he says of *Roccella* "Thus are we enabled to say what is the *quantity* of this colorable matter which the different species of the genus contain, it being in fact a sort of *immediate analysis*" (p. 359), or of *Parmelia* "Most of them contain more colorable matter than the best *Roccellæ*" (p. 361) ‡.

The following are the chief reactions described by Nylander:—

I. With hypochlorite of calcium.
  Erythrinic = a *fugitive* red.
II. With hydrate of potash.
  A. *Chrysophanic* = a *permanent* purple.
  B. *Usnic* = a *permanent* yellow or greenish yellow.
  C. A *fugitive* yellow, changing quickly to red—to which reaction he does not give a special name or associate it with the presence of a special colorific principle.

The *erythrinic* reaction, which is typically developed in the genus *Roccella,* he appears to attribute to erythric acid. The *chrysophanic* reaction, which is typically developed in the yellow *Physciæ* and *Placodia,* he attributes to the presence of chrysophanic acid. The *usnic* reaction, which is typically exhibited in the genus *Cladonia,* he associates with the occurrence of usnic or lecanoric acids. The third group of potash reactions is typically illustrated by *Lecanora cinerea* §.

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* *E. g.* "Lichenes Spitsbergenses," Kongl. Svenska Vetenskaps-Akademiens Handlingar, 1867.

† In a review of Nylander's supposed discoveries in the 'Botanische Zeitung,' 1867, p. 151.

‡ This assertion is quite opposed to the experience of archil-manufacturers, who have, in this country at least, given up the use of the *Parmeliæ* in favour of the *Roccellæ* [*vide* the author's paper in the 'Brit. Assoc. Report,' *post. citat.*].

§ I am far from satisfied of the propriety of the terms here employed by

Leighton formularizes what he terms these "very remarkable reactions," and applies them to the minute discrimination of species and varieties in the complex genus *Cladonia*. He tests these species and varieties by the double reaction of lime and potash, his latest formulæ being the following:—

K+ C+ = yellow reaction with aqua potassæ, yellow heightened by bleaching-solution.
K+ C− = yellow with aq. pot., this yellow being destroyed by bleaching-solution.
K− C+ = No reaction with potash, but a distinct yellow with bleaching-solution.
K− C− = No reaction with either or both chemicals.

Leighton writes, "This new mode of testing enables us to distinguish *more accurately and definitely* the limits of the different species or forms, and appears to afford a more satisfactory confirmation than that obtained by the application of the hydrate of potash alone...... The value of the *chemical tests* in furnishing us with additional and confirmatory specific characters becomes at once plainly manifest," enabling him, he asserts, to classify properly what Acharius, Turner and Borrer, Nylander, and other distinguished lichenologists, who had depended on "external characters and aspects alone," had failed to effect (p. 100)! He refers again and again in some form to the "*real* utility and value of chemical tests" (p. 100) *.

The object of the inquiry and experiments whose results are recorded in the present communication, was an endeavour to determine whether the phenomena described by Nylander and Leighton are so *constant* as to be entitled to constitute "*characters*" of any value in *botanical diagnosis*, on the one hand, and the extent or sense to or in which *novelty* could be said to attach to the introduction of the tests under review, on the other. I read the papers of these lichenologists with considerable surprise, because their results or assertions are in some measure the reverse of the results and generalizations of a lengthened and careful series of experiments, on the colorific properties of Lichens, made by myself nearly twenty

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Nylander, or of the theory, which appears to be implied, that the reaction he describes depends on the presence of certain specified colorific or coloured acids.

* Not. Lich. No. XII. "On the *Cladoniei* in the Hookerian Herbarium at Kew" [tested by bleaching-solution and potash], Ann. Nat. Hist. 1867, vol. xix

years ago [*]. I confess that, had the propounders of the "tests" in question been authorities of less celebrity, I should not have considered it necessary to give myself the trouble of verifying or correcting their observations, or of revising my own former inquiry on a closely allied subject. But Nylander and Leighton are men of such experience and reputation, while their assertions are so confident, that I have deemed it desirable to attempt the reconciliation of the discrepancy between their observations and my own, on the one hand by repeating and extending their experiments, and on the other by revising my own former researches.

My own experimental inquiry relates to the

Reaction of (*a.*) hypochlorite of calcium,
(*b.*) hypochlorite of sodium,
(*c.*) aqua potassæ,
(*d.*) aqua ammoniæ,
(*e.*) iodine solution.
I. On the thallus,—*direct* application.
(*a.*) Cortical,
(*b.*) Medullary } tissue.
II. On apothecia,—*direct* application.
(*a.*) Disk and exciple.
(*b.*) Hymenial lichenine [†].
(*c.*) Asci and sporidia.
III. On aqueous or alcoholic decoctions of thallus, with or without apothecia, the plant being reduced to powder or fragments.

I confined myself as far as possible to the specimens contained in published fasciculi [‡], because they are accessible to all lichenologists, and bear names whose synonyms can be readily ascertained. In special cases, of common species, I experimented on the very considerable contents of my own herbarium. Thus of the cosmopolite *Cladonia rangiferina* [including its 8 varieties or forms, *sylvatica*, Hffm.; *alpestris*, Ach.; *gigantea*, Ach.; *pumila*, Ach.;

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[*] "Experimental Researches on the Tinctorial Properties of Lichens," laid before the Botanical Society of Edinburgh, between 1853 and 1855, and published in its 'Proceedings,' as well as in the 'Edinburgh New Philosophical Journal,' in 1854 and 1855.

[†] *Vide* page 46.

[‡] Especially those of Hepp (Switzerland), Nylander (France), Dietrich (Germany), Leighton and Mudd (England).

pycnoclada, Dél.; *grandis*, Flk.; *tenuis*, Flk., and *lappacea*, Flk.] I tested about 130 specimens from very different parts of the world, including New Zealand, Falkland and Antarctic Islands, Tasmania, Australia, Iceland, Norway, Arctic and North America, the Scotch Alps (Braemar and Breadalbane), the lower hill-ranges of Scotland (Ochils and Sidlaws), the Scottish Islands (Skye), Ireland, England, Wales, and the Channel Islands (Jersey). This considerable group of forms or conditions of growth of a single species was rendered peculiarly suited for examination by the circumstance that they had been named by *one* authority in accordance with the nomenclature of a standard monograph, viz. by Mudd, according to his 'Monograph of British Cladoniæ' (1865). Again, I examined a larger suite of specimens (about 250) of the genus *Roccella*, referable to the types *tinctoria*, *phycopsis*, and *fuciformis* (including *Montagnei*, *pygmæa*, *portentosa*, and *hypomecha*, or others, which appear to me to be unworthy of separate designations), embracing saxicolous and corticolous, maritime and inland conditions of growth, from the following countries or localities:—I. Africa and its islands, tropical, northern, and southern: Rovuma river, 8 miles from the coast, corticolous; Angola, Cape of Good Hope, Mozambique, Cape Verde, and Canary Islands. II. Asia: India and its islands; Bombay, Burmah, Ceylon. III. America [South]: Peru. IV. Europe: England, south coast, Isle of Wight, Channel Islands; French coast. I made selection of the genera *Cladonia* and *Roccella* for full examination in order that I might put the assertions of Nylander and Leighton to what must be, by their own showing, considered a sufficient test.

The majority of my testings gave *no* results worthy of record; reaction was either absent, obscure, or insignificant.

The chief reagents employed by Nylander and Leighton, or by myself, were the following, using in their designations the most modern nomenclature, that of the last edition of the 'British Pharmacopœia' (1867):—

I. *Liquor Calcis Chloratæ*, or Solution of Chlorinated Lime.—This is a solution of the substance known in commerce as "bleaching-powder," or "chloride of lime," and to chemists as hypochlorite of lime, or hypochlorite of calcium. It consists of, or contains, not only hypochlorite of lime, but chloride of calcium and caustic lime, whereof the colorific agent appears to be the *hypochlorous* acid or salt. The officinal liquor may be used by the lichenologist; or a solution may be made by shaking up the chlorinated powder with water, and employing the filtered fluid. On exposure to the air, however made, the solution undergoes somewhat rapid decomposition, the active principle, the hypochlorous acid, being given off, and the inert carbonate of lime formed by absorption of carbonic acid. The liquid should therefore always be *freshly* made when used.

The reaction of bleaching-solution[*] with the colorific principles of Lichens was pointed out by chemists more than 20 years ago. In particular, its applications as a colorimetric test were dwelt upon by Stenhouse. Following him I used this reagent very largely in my first series of experiments on lichen dyes (1850–53). The *novelty* of its present application consists, therefore, in its being regarded as a means of discriminating *botanical species*. What is its value in *this* respect the sequel will show.

In 1853 I wrote thus[†] of the bleaching-solution test, my conclusions being based on several hundred experiments:—"This test requires the greatest nicety and caution in applying it; for, from its strong bleaching or decolorizing power, the least excess destroys the colour of any lichen-dye in solution in whatever menstruum. The *red* colour is generally so delicate and fugitive that, if an excess of the test have been originally added, *no* red reaction may be perceived at all. Hence, from carelessness or inaccuracy in manipulation on the part of the experimenter, a very erroneous opinion may be formed of the colorific quality of a given lichen. Perhaps the safest mode of using the test is in the form of a very weak solution, which will admit of being added in appreciable quantity. As the depth of tint of the red colour struck is to the eye a measure of the quality of colorific material contained in the lichen, so the amount of any given strength of bleaching-solution required to destroy this red and convert it into a pale wine-yellow, has been recommended by Stenhouse as an easily appreciable and sufficiently accurate mode of estimating the same thing quantitatively[‡]. The strength of the bleaching-solution is immaterial, so long as it is not so strong as to destroy the red colour at the very moment of its formation. It is sufficient that we employ the same solution (as to strength) in every case as a standard of comparison. The *medium* in which the colorific principles of the lichen should be dissolved * for the due exhibition of the red reaction varies in different cases. In some instances a simple aqueous infusion may suffice; in others the comminuted lichen must be *boiled* in various solvents; while in others, again, a lime solution is apparently the most suitable. The medium, however, which is of most general application is *alcohol* †, in the form of ordinary spirits of wine. It is especially useful and convenient in experiments on the small scale. I have employed it now in nearly 300 test-tube experiments, boiling the pulverized or chopped lichen for a few minutes in a little alcohol; and I have seldom failed to observe, in greater or less quantity, a whitish or variously-coloured gelatinous extractive ‡, which appears to consist, in great measure, of the colorific principles of the plant. The bleaching-solution test, though extremely convenient and applicable in the generality of cases, cannot in every instance be relied on, either as a quantitative or qualitative indicator of the presence of colorific materials capable of yielding by ammoniacal maceration red or purple dyes. In other words, the action of the test appears to be irregular or capricious, perhaps from being sometimes chemically inappropriate. I have found, for instance, that bleaching-solution struck no red with an alcoholic solution of lichens which, macerated in the usual way in a weak ammoniacal liquor, yielded a well-marked beautiful red dye; while, on the other hand, a red reaction was developed in some cases in which, under the same conditions of experiment, I have failed to obtain an archil. The irregularities in question may depend on—

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[*] I have used throughout the present paper the term "*bleaching-solution*" as a convenient synonym for "liquor calcis chloratæ."

[†] MSS. inedit.

[‡] Over against this conclusion of Stenhouse must be placed the experience of archil-manufacturers, which goes to show that no trustworthy argument regarding the dye-yielding properties of Lichens, either qualitative or quantitative, can be based on experiment in the laboratory on the small scale.

"1. Inaccuracy or carelessness in manipulation.

"2. Alcohol not being the suitable solvent of certain colorific principles.

"3. Ammoniacal maceration not being the proper means of developing an archil.

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* The colorific matter of Lichens is extractable with very different degrees of facility by different solvents.

† The difficulty of applying bleaching-solution directly to the thallus, and the fact that its reaction is best manifested in *solutions* of colorific principles, are arguments for preferring the use of *alcoholic decoctions*.

‡ Assuming the character of a mucous flocculence or precipitate.

"4. Certain lichens not containing the same colorific principles which exist in the majority, at least, of the dye lichens that yield orcine, orceine, and archil.

"At present, however, I am quite unable to explain the caprices of this and other colour reactions in lichens."

If the application of the bleaching-solution test requires such nicety, and its results are so capricious, in a *solution* of colorific principles in boiling alcohol, which is one of their most powerful solvents, it is to be presumed that the application of the test must be attended with greater difficulty, and its results with less certainty, when a drop of the bleaching-solution is merely applied to, or rubbed on, the lichen-thallus!

II. *Liquor Sodæ Chloratæ.*—A solution of chlorinated soda—of what is known to chemists as hypochlorite of soda or sodium, constituting the "Liqueur de Labarraque" of French, and "Labarraque's solution, or disinfecting fluid," of British pharmacy. Along with hypochlorite of soda, the solution contains chloride of sodium and bicarbonate of soda. As in the corresponding case of the lime solution, the hypochlorous acid appears to be the principle on which the reaction with the lichen- colorific principles depends. This test was recommended to my notice by Dr. Stenhouse, who wrote*, "I find the *hypochlorite of soda* even more useful than hypochlorite of lime." I may here at once dismiss *it* from further notice by stating that I was speedily induced to give up its use by finding all its results *negative*. In cases where the corresponding lime solution gave a red reaction, the soda solution gave none; while in no case was the reaction (if any) such as to deserve record.

III. *Liquor Potassæ*, otherwise known as solution of potash, or of hydrate of potash.—From its rapid absorption of carbonic acid, it should be used *fresh*; or if preserved, it ought to be kept in closely-stoppered bottles. The latter, moreover, should be of green glass, from its action on flint glass and oxide of lead. This test has several advantages over the corresponding solution of ammonia. It gives off no vapours irritating to the eye or nose, while it much more readily attaches itself to the texture of the plant. Of all the reagents which have been applied by means of the glass stirrer to the thallus or apothecia, potash solution is by far the most easily applicable. Twenty years ago, and since that period, I used, or have used, potash solution in the microscopical examination of the Lichen-tissues, finding it useful in dissolving oily protoplasm and other material which interfered with the clear delineation of cell-nuclei and tube-walls or septa. Thus, in microscopic analysis of the hymenium, I use or used it to render distinct the outlines, or walls and divisions, of cells or tubes that were otherwise obscure, *e.g.* the paraphyses of *Abrothallus.* The *novelty* of its application by Nylander and Leighton, as in the case of bleaching-solution, consists in the assertion that its reaction with the cortical layer of the Lichen-thallus may be used as a *botanical character*—as a guide, that is, to the classification of *species.* As in the case of bleaching-solution, the sequel will also show how far *this* application of the reagent is to be trusted.

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* Feb. 1867.

IV. *Liquor Ammoniæ,* otherwise Solution of Ammonia, the commoner or weaker solution of Pharmacy.—Ammonia is the most important of all alkalies in relation to the chemistry of the lichen- colorific principles and their coloured derivatives, probably on account of its containing and supplying nitrogen; whilst its importance is fully recognized in relation to the development from lichens of colours of the *archil* class. In experiments with the stirrer on the thallus or apothecia, it is inferior in usefulness (if either reagent is to be considered useful) to potash; while in those on aqueous or alcoholic decoctions containing colorific or colouring-matters in solution, it is as decidedly superior, being of much more general applicability. In the latter class of experiments, I have used it largely for 20 years; and the results were partly made public in my first series of researches on the lichen- colouring-matters. Even at a much earlier date, however, the ammonia test seems to have been applied to the determination of *species.* In 1858, I met with, in the British Museum Herbarium, a specimen of *Cladonia bacillaris,* Ach. (=*C. macilenta,* Hffm.), presented by Sir Thomas Gage, and bearing the following label in his handwriting, "This difficult *species* may be distinguished in all its modifications by immediately turning *yellow* when touched with volatile alkali." Now Sir Thomas's lichens were mostly from Killarney (Ireland), collected in or about 1810. I believe Sir Thomas to have assigned much too high a value to this "criterion" or "character;" but his statement is important as showing that the views of Nylander and Leighton are by no means *new,* whether or not it prove that they are *true*! In point of fact, *chemical* reaction seems to have been not unfrequently recognized by the earlier lichenologists as a *specific character*; and the reason why such recognition has fallen into desuetude is probably to be sought in one of two causes—either (1) that *microscopical* characters have obtained too exclusive attention of late years, or (2) that the *chemical* characters could not be trusted in the determination and classification of species!

V. *Tinctura Iodi*, otherwise Tincture of Iodine, containing a proportion of iodide of potassium as a solvent.—Whilst chemists tell us that the reaction of starch and iodine is so delicate as to be discernible in water containing $\frac{1}{450,000}$ part of its weight of iodine, they also point out that the reaction is apt to be interfered with by a number of chemical obstacles. Moreover, if *chemists* are right in asserting that only the ordinary form of starch gives a *blue* reaction with iodine, *lichenologists* must be wrong in their supposition that what they call "hymenial gelatine" is, in all cases, *lichenine**! The irregularities in the reaction of iodine in Lichens is sufficiently explained by the different reactions which iodine gives with different modifications of starch, and by the aptitude of these reactions to be disturbed by a number of trivial chemical causes. Nylander recommends the following formula for making the iodine- test solution†:—Iodine 1 gr., iodide of potassium 3 grs., distilled water ½ oz. The solution should be kept from light in a black bottle, or in one covered with paper. In testing microscopically, it is sufficient to apply a drop to the edge of the thin glass covering the dissection, under which it will diffuse itself in the water containing the object. I am not aware, however, of any advantage this solution possesses over our officinal tincture of iodine, diluted with water to such extent that the liquid has only a pale sherry colour. For all practical purposes, I have found, for 20 years, the latter solution sufficient. I have used the iodine test chiefly in microscopical analysis of the hymenium, sometimes also of the thallus, in order to the detection of *starch* in some of its modifications; and I pointed out its usefulness in my text-book on the British Lichens (1856, p. 111). I have also employed it as a supposed differential test between Lichens and Fungi, in which respect, however, I have long been convinced it can*not* be relied upon*. So long ago as 1840, Professor von Mohl published† "Einige Beobachtungen über die blaue Färbung der vegetabilischen Zellenmembran durch Iod," containing reference to its applications in lichen-histology. The *novelty* of the present application of iodine consists, as in the cases of bleaching-solution and potash, in its *supposed* utility as furnishing a "character" in the diagnosis of *species*—a utility which, in all the cases in question, we shall presently see is only *supposed*!

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* *Vide* p. 40.

† "On the Reaction of Iodine in Lichens and Fungi," "Not. Lichenologicæ" of Leighton, Ann. Nat. Hist. Jan. 1866, p. 59, March 1866, p. 190, Aug. 1866, p. 106; also footnote, Journ. of Linn. Soc. *vol. citat.* p. 360, and quoted in 'Science Gossip,' 1866, p. 42.

Nylander recommends the application of the reagents he employs to the thallus or apothecia *guttatim*, by means of a glass stirrer. But there is frequently great difficulty, except in the single case of potash, of causing their adhesion to, or absorption by, the lichen-tissues. It is generally necessary to make repeated applications of the reagent, aiding the moistening of the lichen by friction. In the case of bleaching-solution, considerable friction is usually necessary, in order to the development of reaction —friction sufficiently forcible to break up the cortical tissue and expose the medulla. I have found it most convenient first to thoroughly moisten the lichen-thallus with a large drop of the reagent, and subsequently to break up the cortical tissue and expose the medulla under the fluid so applied.

The reagents before mentioned, applied as I have just described, have yielded me, *inter alia*, the following colour-results with different genera and species of Lichens :—

I. *Reaction with Bleaching-Solution.*—In some cases it bleaches, in others darkens, in others modifies, the colour of solutions of lichen- colouring-matters, these reactions depending in great measure on the amount or strength of the reagent employed. Most of the pale yellowish-green or greenish-yellow infusions are bleached or lightened in colour; while of those which are brownish red, reddish brown, yellowish brown, or brownish yellow, some are darkened, but none are lightened, in colour.

Genus *Roccella*.—As already stated, I examined specimens from most parts of the world in which the genus grows, applying the reagent frequently to different parts of the same specimen. I found the reaction, where it occurred at all, immediate, and most vivid at first—a circumstance fully explained in my experi-

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[*] *Vide* paper on "Parasitic Micro-lichens" in Quart. Journ. Micro. Sc. January 1869.

[†] In the 'Flora' (Regensburg).

ments of 1850–53. The colour was nearly as fugitive as where the bleaching-solution was added to an alcoholic solution of the colorific principles. Sometimes scarcely a trace was left on the lichen of the application of the reagent; sometimes a fulvous stain was left, or it was orange-red, or exhibited various shades of red or yellow; occasionally there were differently coloured stains on the same plant. Sometimes a beautiful orange-red was permanent; more generally the stains in question gradually faded. Sometimes the soredia were affected when the general thalline surface was not; at other times the presence of soredia was immaterial in assisting or obstructing the exhibition of the reaction. Sometimes the same branchlet showed in different parts every shade of crimson, as well as no reaction at all. As a general rule, the reaction was most vivid where the thallus was pale, thin, and soft,—least so where it was dark, thick and coriaceous, corrugated and warted. Fertile specimens generally showed it less vividly than sterile ones. These remarks apply generally to *all* the species of the genus examined.

R. tinctoria frequently gave no reaction. This was almost invariably the case where the thallus was dark-coloured and coriaceous. Sometimes there was only a faint tinge on the soredia. Even the smaller, paler, more delicate forms never exhibited the reaction nearly so vividly as *R. fuciformis.*

R. phycopsis: reaction generally vivid where thallus pale-coloured.

R. fuciformis, including its varieties *Montagnei* and others: reaction sometimes vivid crimson in one part and very faint or absent in another part of the same plant; faint or absent generally in the more central, coriaceous, and thicker portions of thallus.

None of the *Roccellæ* gave me any reaction with bleaching solution of *soda.*

Nylander says that the *young* thalli of *R. tinctoria* and *phycopsis* exhibit distinctly and beautifully the erythrinic reaction, the older being very little coloured; but he goes on to remark that (as I understand him), *whatever be their colour-reactions*, these lichens "scarcely differ *specifically*, and cannot always be distinguished from each other" (p. 360). In truth, I regard *phycopsis* as a mere passage form, or connecting link, between *tinctoria* and *fuciformis.* Again, Nylander asserts that *R. fuciformis* does not exhibit the reaction on the thallus, but on its soredia; while "it is a curious thing," says he, "that neither the soredia of *Montagnei* nor *phycopsis* show colour-reaction." Subsequently, however, in the same paper, he admits that the thallus of *R. fuciformis* occasionally shows the erythrinic reaction. The fact, as stated by Nylander and Leighton, that no reaction occurs in *R. fuciformis*, except in the soredia, while it occurs in *R. Montagnei*, save on the soredia, both species being, nevertheless, referable botanically to the same type, is a specimen of the very unequal results of the application of the so-called "Test." There is no reaction in *R. hypomecha*, Nyl.; and yet it is a tinctorial species, having the common properties of the genus. With strange inconsistency, as it seems to me, Nylander sums up:—"Thus are we now able, with the aid of the hypochlorite of lime, with *great facility* to separate and distinguish the *species* of this difficult genus, in which heretofore the determinations have been often uncertain. This reaction manifests also this remarkable fact, that determinations *perfectly exact* may be made even on specimens which are in a *young* and sterile state, and in other respects very incomplete" (p. 360)! Leighton speaks of the erythrinic reaction being at once visible in the *Roccellæ*, some of which, nevertheless, he proceeds to say, show "no reaction." Indeed the papers of both Nylander and Leighton abound in ambiguities or contradictions of this description.

Genus *Lecanora.*—In *L. tartarea* there was generally more or less of a blood-red colour * developed equally on the apothecial warts and on the thallus, especially if mealy or serediiferous—exhibited, however, usually only on friction. Sometimes the colour was very faint, even in the white medullary tissue. As a general rule the colour-reaction was faintest in corticolous forms. In some cases [*e.g.* in a Loch-Lomond specimen, 1855] I found no reaction. Nylander classes *tartarea* with *pallescens*, and separates *L. parella* from both, "since its thallus does not exhibit any reaction with the hypochlorite of lime." In the majority of cases it does not; but I have met with the reaction, exceptionally, more vividly developed than is common even in *tartarea*. For instance, in ordinary corticolous forms of *L. parella* [from Yorkshire, 1855] I obtained blood-red, by friction of the exciple of the apothecia, as deep and distinct as in *tartarea*; while in saxicolous forms, from the Kyles of Bute (1852), the colour-reaction was even more brilliant. Corticolous specimens of *pallescens*, from Cork (1858), also gave the blood-red of *tartarea*. Notwithstanding all that has been written on the subject of their chemical distinction by Nylander and Leighton, I see no reason to modify the opinion I formed many years ago from their structural resemblances, that *tartarea* and *parella*, with all their varieties or intermediate forms, are referable to a single type.

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* This blood-red is exhibited by many crustaceous thalli, *e.g.* of *Lecanora, Urceolaria,* and *Pertusaria.*

Stizenberger describes the "schwer zu bestimmende *Pertusaria velata*" of Switzerland as "leicht an ihrem Erythrinsäure-Gehalt kenntlich"*—a statement that is opposed to the fact that in two specimens (variolarioid and degenerate) from Otago, N. Z., I obtained no reaction; while in a third, which was fertile, a beautiful blood-red was developed—all three specimens having been named by Nylander.

Genus *Parmelia.*—"It is perhaps in the *Parmeliæ*," says Nylander (p. 361), "that the erythrinic reaction presents the *most remarkable advantage* as the means of distinguishing between those species which differ very little in external appearance. In reality the colourable material in the *Parmeliæ* is found underneath the gonidial layer, and not upon it or in its exterior as is the case in the *Roccellæ*. Consequently it is necessary to cut the thallus of a *Parmelia*, so as to expose the medulla, whenever we wish to ascertain whether the species exhibits the erythrinic reaction or not on the application of the hypochlorite of lime." Leighton says the seat of reaction in lichens is a "colourable material which is generated in the gonidial stratum of the thallus," a most unlikely source; but he goes on to give directions for scraping off the cortical layer of *Parmelia*, and all lichens with a cortical layer, "to expose the subjacent medulla, in which the reaction takes place"—another of Leighton's confusing or contradictory assertions. The truth is, that the seat of colorific material in lichens is partly the cortical, partly the medullary, thalline tissues, and partly those of the apothecium.

Nylander asserts that there is no erythrinic reaction in the common *P. saxatilis*; nor did I find it, as a general rule, in a large suite of specimens in my herbarium. But in one specimen, from Maine, U. S. A. (1867), bleaching-solution developed at once, on gentle friction, in the medulla, one of the most beautiful and deep blood-reds I have ever obtained with this reagent among lichens. It is an excellent illustration of the marked difference in results between microscopical colorimetric testings and the manufacture of lichen-dyes—that, while bleaching-solution generally gives no reaction, ammoniacal maceration developes the pigment known as "*Cudbear*," on which account the lichen has been, and still is, largely used as a dye-giving stuff *. "We distinguish . . . . . with the *greatest facility* (Nyl., p. 361) the *Parmelia lævigata* and *revoluta*, which have been so often confounded," the latter giving an erythrinic reaction "whilst the *lævigata* and *sinuosa* do not present the least trace of this reaction" (p. 362). Schærer's No. 612, and Hepp's No. 581, which (according to Nyl., *loc. cit.*) are really *P. revoluta*, both gave me a blood-red; but in the former I found the reaction with potash not to be permanent, while in the latter it was so. This permanency or fugitiveness of potash-reaction is a "new criterion," quite as valid for "separating" these lichens into different species as the various "criteria" of Nylander and Leighton! In several specimens of *lævigata* (*e. g.* from various parts of Ireland, from Loch Lomond, and from England, Mudd's Exs. 69) I obtained *no* reaction; but in a specimen of the same plant from the Pass of Leny, blood-red was developed by bleaching-solution. In other forms of *sinuosa* I sometimes met with an erythrinic reaction, sometimes not. The differences in reaction described by Nylander do not prevent me assigning, as formerly, both *revoluta* and *lævigata*, with a number of other lichens, to the single type *sinuosa*.

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* Review in the 'Botanische Zeitung,' 1867, p. 151.

"The reactive . . . . . demonstrates in the *most decided manner* . . . . . that *P. olivetorum* . . . . . is a *species perfectly distinct* from *perlata*, with which it has been hitherto united" (Nyl., p. 361). He admits, however, that "certain *organic* differences without doubt *also* afford *constant* marks of distinction between the two species; but these marks are much less apparent and much more difficult to verify than the *chemical* difference here noted; so that we must no longer confound them, as has been hitherto done in all the Herbaria, since the most inexperienced person is now able to distinguish them by means of the reactive" (p. 361). The medulla of *P. olivetorum* is represented as giving an erythrinic reaction, while that of *perlata* does not. I have, however, obtained a blood-red, though pale, by friction, in Australian forms of *perlata*. I have had no opportunity of testing authentic specimens of

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* *Vide* paper by the author "On the present Domestic Use of Lichen-Dye-stuffs in the Scottish Islands and Highlands," Seemann's Journ. of Botany, 1868, vol. vi. p. 84.

P. olivetorum; but I have no reason to suppose that in this case, exceptionally, chemical reaction furnishes a character sufficient of itself to separate or constitute species. *Perlata,* like *saxatilis,* is an instance of a long-known and widely used dye-lichen [capable of yielding archil] which gives, as a rule, no reaction with bleaching-solution.

Genus *Umbilicaria.*—Nylander asserts that the medulla of most of the *Umbilicariæ* exhibits an erythrinic reaction (p. 362). He admits, however, that in the same species [e. g. *hyperborea*] the reaction may be obscure or distinct, and that in this and other species of the genus it may be better exhibited in *young* specimens than old. The result of my testings of a large suite of specimens in my herbarium is that it is only exceptionally, after much friction, and faintly that an erythrinic reaction is developed at all. Nylander's statement, that there is only "a small quantity of colourable matter which is to be found in them," is opposed to the experience of archil-manufacturers, who at one time, if not still, used, or use, one or more species as dye-lichens [*U. pustulata* and *U. murina*]*.

II. *Reaction with Potash.* A. *Chrysophanic.*—In lichens whose colour is yellow, orange, or red, the seat of colour is, according to Leighton, following Nylander, a "powder . . . . generated on the surface" of the thallus or apothecia. I have not given special attention to *this* subject; but it seems to me extremely unlikely that colouring-matter should not, in these as in other lichens, reside in the cells or filaments, or intercellular matter, of the cortical or medullary tissues †. There may be, and frequently is, an efflorescence of granular colouring-matter (just as I believe there is of colorific principles in a crude form) in lichens, where such matters or principles exist in, or are secreted or excreted by, the thallus. But it does not appear to me that Nylander's and Leighton's descriptions of the seat of colour in lichens are here scientifically correct.

The development of a purple reaction in apothecia which are naturally of a deep red is generally obscure, if it exists at all, and cannot, so far as I can see, serve any good purpose in classification, *e. g.* in the erythrocarpous *Lecanoræ* and *Lecideæ* [*Lecanora hæmatomma* and *ventosa*]. In no lichen is the colouring-matter of apothecia so easily removed by potash as in those of the true *L. ferruginea*: it is at once dissolved out without being rendered purple, is carried away on the stirrer, and diffused over the thallus. In the erythrocarpous *Cladoniæ* the same thing appeared to occur; the natural rich crimson colouring-matter was at once dissolved out, staining the podetia. In some cases, however, the colour was at once changed into brown; and in the natural state the red apothecia of *Cladonia* frequently become brown * as the result of age and desiccation, *e. g.* in the *cornucopioides* group. I doubt, moreover, the propriety of describing the reaction of potash on the red apothecia of *Cladonia* as *chrysophanic*, and on the podetia or folioles of the same species as *usnic*.

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* *Vide* author's paper, "On the Dyeing Properties of Lichens," Edin. New Philos. Journal, July 1855, Table ii.

† *Vide* section on *Colour* in author's 'British Lichens' (1856), p. 47.

On account of its chrysophanic reaction, Nylander separates *Physcia parietina* from *P. candelaria*. "The potash shows their differences instantly in the very least atom of either their thalli or their fruits; for the *candelaria* is not changed in colour by this reactive, whilst the *lychnea* becomes of an intense purple. This is so evident that we are by these means able to recognize either the one or the other of these two lichens even without opening the papers in which they may be enveloped, provided the paper be permeable by the solution of potash" (p. 363). But, in exceptional cases, I have found the reaction in *parietina* obscure [*e. g.* in Hepp's No. 595]; and Nylander himself admits that certain forms of that species do *not* exhibit the reaction, save on the periphery of the thallus, and on the epithecium. This occurs, he admits, also in *Physcia flavicans*, *P. chrysophthalma*, and *Placodium murorum*. Exceptions of this kind are sometimes so numerous and of such a character, as to render the general rule quite worthless, and altogether to invalidate the utility of the test. In the fruited state, *parietina* and *candelaria* are sufficiently separable by their sporidia; while the attempted distinction of sterile (which may be abortive or degenerate as well as young) conditions of lichens by *chemical reaction* appears to me to be at the least fraught with danger. In no case have I been able to satisfy myself of its safety or propriety. Nylander classes *candelaria* with *vitellina*, because they have the common property of non-reaction with potash. But I have found the chrysophanic reaction sometimes exhibit itself in the *Lecanora*. There are various other exceptions to the general rule as regards the yellow *Physciæ* and *Placodia.*

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* *Vide* author's paper on "Arctic Cladoniæ,"—Trans. Botanical Society of Edinb. vol. ix. p. 176.

On the other hand, Nylander remarks on the absence of the reaction in the yellow *Platysmata.* But to this generalization also there are exceptions. In specimens of *P. nivale* from Braemar (1855), I found the deep orange (natural) stains at the base of the plant at once become red with potash, while in Norwegian forms (1857) the normal yellow of the thallus exhibited the same reaction. No effect, however, was produced on the purple stains at the base of *P. cucullatum*, or on the normal yellow of its thallus. If we are to trust the chrysophanic test, we must come to the conclusion that there are various *yellow* colouring-matters in lichens, many of them having, however, the same tint; for the reaction is absent in the beautiful yellow thalli of *Evernia vulpina, Sticta aurata, Lecanora chlorophana* and *oreina, L. vitellina* (as a general rule), *Lecidea galbula, geographica,* and *citrinella.* On the other hand, the test in question associates *Physcia parietina* and other *Physciæ* with *Placodium aureum, elegans* and *murorum*, and other *Placodia, Lecanora cerina, fusco-lutea, aurantiaca,* and other *Lecanoræ, Lecidea ferruginea* and other *Lecideæ.* In this group the magnificent crimson developed is equally intense on the apothecia and thallus; but the disk of the apothecium has sometimes a natural crimson colour instead of its usual yellow, *e.g.* in *Pl. murorum* or *L. aurantiaca.*

B. *Usnic* reaction, distinguished (from what may be provisionally termed the *green-red* sub-reaction) by its *permanence* [according to Nylander].—The typical beautiful lemon-(greenish) yellow is best exhibited on thalli which are pale or white, and in proportion to their whiteness. Thus the reaction is most vivid and conspicuous on the white thallus of various *Physciæ* [*stellaris, cæsia, astroidea*], *Lecanoræ* [*Reuteri, glaucoma, tartarea*], *Lecideæ* [*canescens, contigua*], *Pertusaria, Phlyctis, Lecanactis, Arthonia,* and *Stereocaulon.* It is thus developed equally in the foliaceous and fruticulose thallus, and in that which is crustaceous, especially when it is thick and tartareous, and grey or white, in saxicolous species. The intensity and character of the colour vary greatly. Thus in *Lecanactis illecebrosa* it is less vivid or beautiful than in *Arthonia pruinosa*; in the saxicolous *Lecanoræ* and *Lecideæ* it is frequently olive-green; in *Stereocaulon*, where any reaction is visible at all, it is brightest where the thallus is palest and most delicate; in *Lecanora subfusca* it occurs distinctly only in those forms which have a distinct white crustaceous thallus, e. g. *intumescens*. Sometimes a corticolous thallus is so thin and effuse, though white, that the lemon-yellow or olive-green reaction might be attributed to the subjacent bark, *e. g.* in some forms of *Pertusaria communis* and *Lecanora subfusca*; but that the reaction, even in such cases, is attributable to the lichen, I hold proven by the fact that I have tested the adjacent still thinner thallus of *Opegrapha*, or other genera or species, without the development of the same reaction.

C. *Green-red* reaction—where the greenish or yellowish tint first developed by potash passes more or less rapidly or gradually into a reddish or brownish-*red* colour.—It appears to me that this distinction of Nylander's, the permanency or transiency of the green or yellow, is a most artificial and unnecessary one; for I find it does not hold good in the very species and genera selected by himself as typical. Thus *Lecanora cinerea*, on the one hand, and the *Cladoniæ*, on the other, yielded me a series of results different from those recorded by himself or Leighton. A large suite of specimens of *L. cinerea* in my own herbarium yielded me, for the most part, negative results, both with potash and bleaching-solution. In a few exceptional cases (3 Irish specimens, 1858, and 2 Norwegian, 1857) various tints, from olive-green to bright lemon-yellow were developed by potash; but in no case did the colour in question change to red. *Parmelia acetabulum*, says Nylander, gives the same reaction as *L. cinerea*; while, in my hands, it neither yielded the same reaction with bleaching-solution nor with potash, resembling *P. Borreri* as to the former.

Genus *Cladonia*.—On the other hand, as a general rule, the same green or yellow colours developed in the *Cladoniæ* did change, sooner or later, into red or brownish-red of some shade. On reexamining, several days or weeks after their first testing, the specimens in my herbarium, or in various published fasciculi, to which I had applied potash, I found both paper and plant bearing stains that were sometimes *blood-red*, though more frequently brownish-red. The marks on the podetia, or folioles, that had previously been green, were now of a distinct red hue. Sometimes the tint was more of a tawny yellow; and in some cases a deep fulvous tint was natural, *e. g.* in *deformis*. The transition to red did not occur in every case, nor was it always well marked. The same result which was in these cases effected by time, could be, frequently at least, effected at once by a subsequent application of potash, and less frequently by ammonia. The latter reagent, on second application after a varying interval of time, sometimes left a permanent greenish-yellow in cases where potash produced a blood- or crimson-red. In other cases the second application of ammonia imparted a brownish tinge to the original greenish-yellow reaction. The secondary development of red or brown tints, however, was commoner with potash. The depth of the red colour appears, frequently at least, to be proportionate to the brilliancy of the previous lemon-yellow; and it is therefore most marked on the folioles, especially when they are white and mealy, *e. g.* in some forms of *squamosa*. Potash here developes various beautiful shades of green and yellow, which change (or not) afterwards to various shades (sometimes beautiful and deep) of red, the same reaction being obtained by a second addition of potash or ammonia.

It has appeared in my experiments that *Cladoniæ* which have *red* apothecia generally give a secondary red reaction with potash, while those with *brown* apothecia do not (e. g. *aggregata*, *furcata*, *gracilis*). This may be a mere coincidence; at all events it is as yet a doubtfully correct generalization.

The *transience* of the green colour in *Cladonia* is in contrast with its (at least comparative) *permanence* in *Parmelia*, *Physcia*, *Lecanora*, *Lecidea*, *Urceolaria*, *Phlyctis*, *Lecanactis*, and *Arthonia*.

No reaction occurs when the thallus, especially the podetia, is brown or dark-coloured, *e. g.* in forms of *furcata*. *Brown* apothecia are also unaffected by potash. Reaction is always obscure or faint in *old* specimens; so that the intensity of colour developed depends, greatly at least, on the age or freshness of the specimen operated on. Hence the specimens in Schærer's Exsiccati gave a reaction which was either not perceptible or not vivid. Even the heightening of the natural greenish-yellow colour of the plant was in these cases rare.

The greenish-yellow reaction is most vivid where the thallus is white, grey, or pale; it is deepest generally on the folioles of the horizontal thallus, especially where it is microphylline and sterile, *e. g.* in var. *erratica* of *degenerans*, from Otago. The podetia and folioles or squamules sometimes give different reactions, at least as to shade or intensity of colour. The same differences are exhibited in different specimens of the same species, according to the conditions of growth or preservation, *e. g.* in *retipora*.

There may be no reaction in one part of the same specimen which in another yet exhibits the typical yellow reaction, *e. g. retipora.* All conditions of reaction—absence, obscurity, or intensity—may occur in different forms or conditions of the same species, e. g. *pyxidata.* Reaction, where it is developed at all, is immediate. The development of yellow is commoner with ammonia than with potash.

"The application of both the reactives" (potash and bleaching-solution), says Leighton, "enables us to distinguish *more accurately* and *readily* the different *species* which have been heretofore comprehended under the name *rangiferina*"* (p. 119). "True or typical" *C. rangiferina* has, according to him, the reaction K+ C−; *C. sylvatica*, Hffm., has Kf†+ C+; var. *alpestris*, Sch., he refers to *C. sylvatica*, with the reaction Kf+ C+ ; while *pumila*, Dél., is a form only, also referred to *C. sylvatica*, and also having reaction Kf+ C+. *C. pycnoclada* has the double negative reaction K− C−. As already mentioned, I made a special examination of the forms of *C. rangiferina* and its allies, of which my herbarium possesses a considerable suite of specimens both from foreign and home stations. The result was this, that, even in the ordinary form of *C. rangiferina*, as determined by Mudd, potash produced in some cases a distinct greenish-yellow, while in others there was no reaction. In some cases the said greenish-yellow was intensified by bleaching-solution, in others it was *un*affected, while in a third group it was decolorized. Generally no effect was produced by bleaching-solution on old stains made by potash some months previously; which stains were frequently reddish-yellow or reddish. The same phenomena were observed in *Cl. pycnoclada* from New Zealand. Moreover, in general terms, the same reactions occurred in *sylvatica, alpestris*, and the type. I therefore regard chemical reaction in these and such cases as utterly useless, or misleading, in diagnosis. Notwithstanding the supposed distinctions indicated by Leighton and Nylander, I still hold to the opinion that *sylvatica, alpestris, pycnoclada*, with their allies, may with propriety be referred to the single type *C. rangiferina*‡.

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* Ann. Nat. Hist. 1867, vol. xix.

† I am not aware what distinction Leighton draws between K and Kf.

‡ Observations on the confusion between *varieties* and *species* in the genus *Cladonia* will be found in the author's paper "On Arctic *Cladoniæ*," Trans. Bot. Soc. of Edinb. 1867, vol. ix. pp. 169, 175, 178.

Leighton's scheme presents, however, other difficulties within itself. For instance, he indicates two forms of *Cl. ceratophylla*, Eschw., one with the reaction K— C—, the other with that of Kf+ C+[*]; of *Cl. Flörkeana*, Fr., form *seductrix*, Nyl., he mentions, as a noteworthy matter, that Nylander gives the reaction as K+, while he found it the reverse in a specimen in the Kew Herbarium, named by Nylander himself (p. 119). "Different reaction," he also asserts, "separates *amaurocræa* and *uncialis*, to say nothing of the different external characters" (p. 120)! In neither the one nor the other did I find the reaction so distinct as to be worthy of record; and I do not think the "external characters" differ to such extent as to forbid their reference to a single type [†].

III. *Reaction of Iodine.*—I have elsewhere [‡] shown that the iodine test cannot be depended on as a means of diagnosing *Lichens* from *Fungi* [§]. In true Lichens, applied to the tissues of the hymenium, I have met with the following results:—There is frequently a beautiful *blue* reaction, embracing various shades of prussian- or indigo-blue; in other cases the colour developed is *violet*, embracing various shades between blue and red; in a third group the colour-reaction is *red*, of various tints: in a fourth it is *yellow*, which is apparently merely the colour of the reagent; in other words, there is *no* reaction. Moreover, in the same species under different circumstances, the reaction may be obscure, if present, or it may be absent.

Nylander asserts that the medulla of *Roccella Montagnei* strikes a *blue* with iodine. In some cases it does, but in others it does not. I made special study of the reaction of iodine on the medullary tissue in the genus *Roccella*, with the following results. In all the species examined it was variously present or absent. It was absent in *fuciformis*, *Montagnei*, *phycopsis*, and *tinctoria* in certain cases; while in other specimens of the same species it was present in some form, though frequently faint and slowly developed. As a general rule, it may be said to occur throughout the genus. The reaction is most marked where the thallus is palest and softest, *e.g.* in Ceylon Orchella-weed [which =*R. Montagnei*], where the reaction is immediate and the colour deep; it was most distinct of all in Zambesi Orchella-weed, which is the same form of *R. fuciformis*. In the ordinary, non-coriaceous forms of *R. fuciformis*, as imported by archil-manufacturers, I never met with it; nor was there any reaction in Leighton's Exs. No. 171. The reaction is least distinct where the thallus is dark-coloured, terete, and coriaceous. In *R. tinctoria* (thickest form) the colour was dull indigo, or absent. In *R. phycopsis* there was no reaction, or a pale azure was slowly developed.

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[*] Ann. Nat. Hist. 1867, vol. xix. p. 112.

[†] Nylander (Lich. Scand. p. 59) seems to hold a similar opinion.

[‡] "On *Arthonia melaspermella*," Journ. of Linn. Soc. 1867, Botany, vol. ix. p. 283.

[§] Nylander disclaims any desire to consider Iodine more than an accessory means of distinguishing certain of the lower Lichens from the Fungi; but I deny that this test can in any sense, or with any safety, be accepted as *diagnostic* between members of these two great orders.

This colour-reaction was of no use in any case as a means of diagnosis.

Leighton says iodine distinguishes *Sphærophoron coralloides* from *S. fragilis*, "a long-desired distinction" (p. 442)—a phrase which, if it mean anything, appears to imply his anxiety to multiply species by means of minute and trivial differences! I found iodine to produce a blue or violet in the medullary tissue of the former lichen, a yellow in the latter. Nevertheless my opinion is not influenced to regard them otherwise than as referable to a single type.

My whole present experiments and inquiry have led to the following general conclusions, or have embraced the following general results:—

I. Not only do the results obtained by different observers on the *same* species differ widely, but those of the *same* observer at different times or in different circumstances do so also. Leighton and Nylander do not always agree. Th. M. Fries differs from both *; while my results are also frequently quite of an opposite character to theirs. Moreover I have found in reexamining the *same* specimens, that different results have been obtained. In one case a distinct colour-reaction might be obtained, while subsequently it was faint or absent. This must have been due, apparently, to some trivial difference in the reagent or its application, or in the parts of the same thallus operated on. A difference in the degree of concentration or freshness of the reagent, or in the amount of friction employed, would account easily for all the discrepancies in the results obtained.

II. Not only do results differ in different specimens, or individuals, of the same species, but in the *same specimen* at different times, or in different parts of it. In the same species reaction may be distinct, faint, or absent. These differences are determined, in great measure at least, by the conditions of growth * or preservation of the specimens (*e. g.* by their degree of freshness—the interval that has elapsed since they were collected; the locality of growth in relation to climate, elevation above, or proximity to, the sea; degree of development in relation to sterility, hypertrophy, or degeneration). The differences exhibited by the same species when freshly collected, on the one hand, and after long preservation in the herbarium, on the other, are frequently most marked. Many of the specimens operated on in my experiments were collected so long ago as the beginning of the present century, while none were freshly collected for the purposes of the present inquiry. For the reasons formerly stated (p. 40), I have preferred to make use in great measure of the authenticated specimens contained in published fasciculi, some of them comparatively old,—contrasting the results with those obtained in specimens from my own herbarium, collected at much later, and in some cases at very recent, dates. But the results so obtained have satisfied me of the non-necessity of engaging in a wider inquiry, or of enlarging the area of experiment by making special collections for the purpose. I have no doubt, however, that still more striking results might have been obtained by operations on *freshly collected* lichens, in their different stages or conditions of growth.

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* *Vide* the Table of *Cladoniæ* given in his 'Lichenes Spitsbergenses,' p. 29.

III. The frequent uncertainty of result, the irregularity or *inconstancy* of colour-reaction, even in the same species, renders it impossible to place confidence in *chemical* characters as a means of diagnosing *botanical species.*

IV. Even where the phenomena are comparatively *constant,* I have in no case found colour-reaction assist me either in uniting or separating species or varieties.

V. The discrepancies that occur among lichenologists making efforts to discover and apply chemical tests for species, occur equally among experimenters on a larger scale, as well as among professional chemists studying scientifically and with no ulterior object the lichen-colouring-matters. Westring, for instance, failed to find any trace of red colouring-matter in the genus *Roccella* or in *Lecanora parella* [*]!

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* Modifications of reaction according to conditions of growth in the same species are illustrated in the author's 'Experiments' (1st ser.), 1854, Table xx., p. 35.

VI. Colour-results vary not only with the scale on which experiment is conducted, but with the most minute and apparently trivial of its details. Thus botanical testing, according to the pseudo-system of Nylander and Leighton, gives results frequently quite of an opposite kind to those of experiment on dyeing-properties, and these, again, as conducted in the laboratory, on the small scale, to the results obtained by the archil-manufacturer, on the large scale. In the following dye-lichens which yield Archil to the manufacturer, no *corresponding* reaction occurs with bleaching-solution applied on Nylander's plan:—*Umbilicaria* (no reaction save exceptionally); *Roccella* (reaction, where it occurs, does not correspond to *colorific* value); *Parmelia perlata, Lecanora parella, glaucoma,* and *calcarea.* On the other hand, a blood-red or crimson is developed by the testing-process in certain non-dyeing species, e. g. *Parmelia sinuosa, Borreri, rugosa,* and *acetabulum.*

At the Paris Exhibition (1867) I was struck with the great variety of quality (*e.g.* shades of colour) in products essentially the same, attributable, apparently, to slight modifications of the process of manufacture. Darwin remarks, "The *chemical* qualities, odours, and tissues of plants are often modified by a change which seems to us *slight.*" He gives several instances (hemlock, aconite, digitalis, rhubarb, &c.), which are "remarkable because it might have been thought that definite chemical compounds would have been little liable to change, either in quality or quantity" [†]. An apt illustration is to be found in the very different products obtainable by chemists, on the one hand, and archil-manufacturers, on the other, from a single lichen, *Roccella tinctoria*, apparently according to mere differences in its place of growth. Archil-manufacturers, as I have elsewhere shown, constantly recognize the fact that very different tinctorial values are to be attributed to the same *botanical species* of "Orchella-weed" from different localities [‡].

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[*] Crell's 'Chemische Annalen,' 1799, vol. ii. p. 81, in note; quoted in Krempelhuber's 'Geschichte der Lichenologie,' vol. i. p. 95 (1867).

[†] On Variation of Animals and Plants under Domestication, vol. ii. p. 274 (1868).

[‡] Journ. of Botany, 1868, vol. vi. p. 107. The irregularities of colorific results with reagents of the same class, and the causes of modification of colour-results in the same species, are subjects illustrated more fully in the 'Phytologist,' 1854, vol. v. pp. 181–2.

VII. The results of experiment on the small scale furnish no index or guide to commercial utility. My own early experiments satisfied me of this; and my impressions have been confirmed by inquiry made subsequently, both in France and England. Importers of orchella-weed and archil-manufacturers have not yet succeeded in discovering any chemical means, short of manufacture on the large scale, of estimating the different colorific value of the same species. And yet we find lichenological systematists (classifiers, and describers of so-called species) confidently professing to accomplish what all the experience of chemists and manufacturers throughout the world has hitherto failed to effect!

VIII. My results are, on the whole, *negative*, so far as concerns my ability to confirm the confident assertions of Nylander and Leighton anent the value of chemical reaction as an absolute or corroborative "character" in botanical diagnosis. Nevertheless the relative experiments and inquiry eliminate many facts of a positive kind in regard to the colorific reactions and properties of Lichens—a subject, I am convinced, which is far from being thoroughly known to, or understood by, either lichenologists or chemists. *Inter alia*, unlooked-for results occasionally occur in species supposed to be devoid of colorific value or properties; while in other lichens, which are used on the large scale in domestic dyeing or in commercial dye-manufacture, the results are strangely negative, contradictory, or insignificant.

On the whole, I am disposed to apply, to the so-called "Criteria" whose value has been the subject of the foregoing inquiry, what Blumenbach is reported to have first said of phrenology, but which has, no doubt, been applied to very many and very different subjects in science, both before and since his time:—"There is much in it that is *new*, and much that is *true*; but what is true is *not new*, and what is new is *not true*." Not only are Nylander's and Leighton's observations not confirmed by the repetition of their experiments by other authorities; but I believe it is *im*possible to obtain the results they so confidently promise by any single "character," whether chemical or morphological, or, indeed, in many cases at least, by any combination of characters! The papers of these distinguished lichenologists appear to me to illustrate the danger of hyperenthusiasm in matters of science (which are, or ought to be, strictly matters of *fact*), and the aptitude of even the most experienced observers to be misled by a false scent, by a hobby, or a theory.

I can*not*, then, commend *chemical* "characters" to the confidence of the lichenologist. At the same time I hold that a *botanical diagnosis* ought to be based on *all* the characters at the command of the observer, including those which are *chemical*. And, though I believe that characters drawn from morphology, gynæcology, anatomy, and physiology must ever stand in the foreground, it would be wrong in the lichenologist not to avail himself of *any* assistance that may, in certain exceptional and difficult cases, be supposed to be afforded by chemical reaction in diagnosis. I am very far from desiring to depreciate *chemistry* as an adjunct to botany in plant-diagnosis; but so far as concerns the *Lichens*, I believe their chemistry is as yet in far too crude and unsatisfactory a state to warrant us in expecting any assistance *that can be relied upon* from colour-reaction in the determination of *species*!

Palmæ Amazonicæ, sive Enumeratio Palmarum in itinere suo per regiones Americæ æquatoriales lectarum. Auctore RICARDO SPRUCE, Ph.D., F.R.G.S.

[Read January 21, 1869.]

CHAPTER I.

INTRODUCTORY.

THE Palms described in the following pages are not to be understood as comprising all the species known to exist in the Amazon valley, nor even all those seen there by the author, but only those which he was able to preserve specimens of, and to describe, more or less completely, on the spot. The chief object of his travel being to collect herbarium specimens in large quantity, certain families were, from the unwieldy size of their leaves and inflorescence, or from their succulent nature, almost entirely excluded from the general collection, and were rarely sought for except when circumstances confined him for a length of time to some very limited area whereon he had already almost exhausted the exogenous and cryptogamic flora. The plants thus only partially gathered and studied are chiefly Palms, Arads, Cyclanths, and Bromels. Whenever, therefore, any locality is mentioned in the following enumeration with great frequency, it would be erroneous to conclude that more palms really exist there than in other localities which are rarely spoken of. It is rather to be taken as a measure of (in other respects) lost time to the author—of swollen rivers and inundated forests, rendered nearly or quite intransitable—of the superintendence of (too often) lazy and drunken Indians at the building and caulking of boats—of regions and seasons of scarcity, when from actual deficiency of food he was unable to move far away from his resting-place, and was thrown back on describing and preserving such objects as were close at hand. If not many of the larger species of palms appear in the following enumeration, it is partly because the collecting and preserving of such requires much time and labour, which could mostly be better bestowed, and partly because a large proportion of them have already been described and figured*.

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* A few palms of my gathering are unavoidably omitted, the specimens being deposited in the Museum at Kew, which I have been unable to revisit. And although Dr. Hooker has most liberally placed in my hands all the herbarium-specimens of palms collected by myself, the museum-specimens are too bulky

I gathered palms in Equatorial South America, during the years 1849–1860, on the following areas:—

	Lat.	Long. (Greenw.).	Alt.
1. Pará	1°–2° S.	48°–49° W.	Plain.
2. Amazon, between the Tapajoz and Trombetas	0¾–2½ S.	54 –56½ W.	Plain.
3. Confluence of Rio Negro and Upper Amazon (or Solimoens)	3 –3½ S.	59 –60 W.	Plain.
4. Upper Rio Negro, river Uaupés, river Casiquiari, Upper Orinoco	0¼ S.–5¼ N.	66 –68 W.	Plain to 2000 ft.
5. Tarapoto, in the Andes of Maynas (*i. e.* East Peru)	5½–7 S.	76 –77 W.	to 5000 ft.
6. Forest of Canelos (Eastern side of Quitenian or Equatorial Andes)	0½–2 S.	76 –78½ W.	to 5000 ft.
7. Plain of Guayaquil, and Western side of Quitenian Andes	1 –3 S.	79½–81 W.	to 5000 ft.

The only palm actually gathered on the last area is a species of *Phytelephas*, which will be described at the end of this memoir.

The true Andine palms, those namely of the forest-clad slopes of the Andes, beginning at 6000 feet with *Ceroxylon andicola*, and extending upwards to at least 11,000 feet (where there are still noble Laurels and other trees that give the hill-forests a semi-Amazonian character), are entirely unrepresented in my collection. They were left to be collected when I should have nearly exhausted the ferns and mosses; but ere that time came I was disabled from collecting at all. There is therefore still an interesting if not very copious harvest of Andine palms to be reaped by some future traveller, especially in the eastern cordillera of the Equatorial Andes.

Thirty years before my own visit to the Amazon, Dr. von Martius, the most eminent botanist who ever visited South America, had travelled on that river and on one of the largest of its northern tributaries, the Japurá, during the space of eleven months

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and fragile to be sent to a distance, and for want of them some of the following descriptions (especially of the Cocoinæ) will be found lacking in completeness. To Dr. Hooker and to Professor Oliver I have also to express my obligation for the loan of books and for extracts from works I was unable to consult personally.

(in 1819–20). Protected by the Emperor of Brazil, and provided by the government of that country with all possible aids in the prosecution of his enterprise (rarely lacking numerous Indians to row his boats and to cut down or climb the trees of which he desired to secure specimens) he possessed advantages seldom enjoyed by a solitary botanist travelling and working in so modest a way as myself. And it must be admitted that he made the best possible use of those advantages, and that the amount of work performed by him in that short space of time was enormous. The family of Palms had all through his previous travel in the central and southern provinces of Brazil engaged his particular attention, and on the Amazon he found a grand and almost virgin field for their study. Of the nobler and loftier species, growing along the banks of the main river, scarcely any were left unnoticed by him; and among the smaller species, hidden away in the primeval forests, he detected many new and striking forms. The palms collected by Martius on the Amazon amount to about sixty-six species, by far the most of them new, and scarcely more than ten of the whole number known to exist elsewhere at the date of his published descriptions of them. Of the eighteen genera in which those species were comprised, four were new and peculiar to the Amazon region; and of a fifth new genus (*Œnocarpus*), containing five species, only one species was known to the author beyond the Amazon, in the neighbouring province of Maranhão. In *Bactris* alone, he enumerated seventeen Amazon species, all but one peculiar to that region; and *Geonoma* had eight (or nine) species not then known elsewhere. Of the genus *Astrocaryum*, counting altogether ten species, seven were found by him on the Amazon, and only one of the seven in any other part of Brazil. Such are a few of the results of his travel and work on the Amazon.

Dr. Martius's study of the Palms of Brazil was afterwards supplemented by that of the Palms of the rest of the world; and the result was made public in the 'Genera et Species Palmarum'—the noblest monograph of any family of plants which has ever issued from the press, and which will cause the name of Martius to be mentioned along with that of Palms to the end of all time.

I confess to have followed the steps of this great botanist with ever-increasing admiration; for not only did he explore the ground for palms, almost exhaustively, along his whole line of travel, but plants of all other families were eagerly collected, and afforded him several new genera and species, most of which have been described and figured in his great work on the Flora of Brazil, and in the 'Nova Genera et Species Plantarum Brasiliensium.'

Nor did he leave the minute cryptogamic tribes ungathered; and it is to him we owe our first knowledge of several fine species. Perhaps the handsomest of all the mosses of the Amazonian plain is *Leucobryum Martianum* (Hsch.); and it has the rare peculiarity (in that family) of gay colour, the snowy foliage of the stems contrasting beautifully with the crimson involucral leaves. In the sombre forests of the Rio Negro this moss, along with two fine hepaticæ, *Lophocolea Martiana* (Nees) and *Jungermannia Pterygophyllum* (Mart.), sometimes with tufts of Hymenophyllum or Trichomanes interspersed, completely invest the prostrate trunks of the fallen monarchs of the forest, and hide their decay under a tapestry of the rarest beauty.

A distinguished zoologist, Mr. A. R. Wallace, had already been some time on the Amazon when I arrived there. In addition to his special pursuits, he found time to make sketches of the most notable of the palms he encountered in his travels. Those sketches were among the very few things he was able to rescue from the flames when the ship in which he was homeward bound was burnt in the middle of the Atlantic ocean; and he afterwards published them in a handy volume, which contains the most characteristic representations of American palms that exist within a small compass*. They were accompanied by so full an account of the uses of the principal kinds, that it almost precludes the necessity of my devoting any space to that topic; and I shall accordingly rarely touch on it, except where the use to which a palm is put illustrates its structure.

Mr. Wallace worked at palms chiefly on the Rio Negro, where he preceded me by about a year. It was there he found and figured two most remarkable palms, which he has published under the name of *Leopoldinia Piassaba* and *Mauritia Caraná*. The first of these I was able to describe pretty fully in the Linnean Journal for 1860, and to show that Mr. Wallace had rightly placed it in *Leopoldinia*; but the second, I regret to say, my materials have not enabled me to illustrate as it deserves, although they suffice to prove it so far distinct from typical *Mauritia* as to take rank at least as a subgenus.

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* Palm-trees of the Amazon and their uses. By Alfred Russel Wallace. 1853.

It may serve to foreshow the vast number of specific forms that probably yet remain to be detected in the forests of the Amazon, especially among the smaller palms, if I mention that although the river Japurá, explored by Dr. Martius, and the Rio Negro, where most of my own and Mr. Wallace's palms were obtained, are nearly parallel and not very far apart, and although I have repeatedly compared my specimens with the descriptions of Martius and Wallace, yet, *out of fourteen species of* Geonoma *gathered by myself, I have been able to identify only two with Martius's, and out of fifteen species of* Bactris *only three.* Of the latter genus Mr. Wallace has figured six new species, whereof one seems certainly the same as one of mine; but the other five do not exactly agree with any that I gathered.

CHAPTER II.

THE DISTRIBUTION OF PALMS IN THE AMAZON VALLEY*.

§ 1. *The Five Palm-Regions of the Amazon Valley.*

The great Amazonian Forest, extending northward to the cataracts of the Orinoco, in Venezuela, southward far into the centre of Brazil, and westward almost to the very crest of the Andes, is entirely included in Martius's "Chief Palm-Zone" (10° N.–10° S. lat.), and as respects its Palm-vegetation may be divided into the following regions:—

I. *The Coast- or Submaritime Region*, viz. the country adjacent to the mouth of the great river, both terra firma and islands, as far inland (or westward) as there are tidal creeks and the sea-breezes have a manifest influence on the vegetation. This region ought to include the whole of the Guayana coast, to the mouth of the Orinoco (and even the West-India Islands?).

II. *The Granite Region of the Casiquiari.* I call it by this name because while it belongs equally to the Rio Negro and to the Orinoco, extending down the former nearly to lat. 2° S., and down the latter to and beyond the cataracts (lat. 6° N.), the Casiquiari is its middle term, from which it stretches eastward through

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* Being unable for the present to examine all the materials that exist in our herbaria and museums for a complete account of the geographical distribution of Amazon palms, especially as compared with the rest of the world, I propose to defer that task to a future day, and shall limit myself now to sketching some general features of the palm-vegetation of the Amazon valley, looked at by itself, and with little reference to that of other countries.

Guayana as far as to the falls of the rivers that run direct to the Atlantic, and westward nearly (or quite) to the foot of the Andes. This may be described as one great sheet of granite and gneiss, whose mean level is scarcely anywhere 500 feet above the sea, and out of which rise peaks, masses, and ridges to a height of from a few hundred to 10,000 feet, all of them destitute of running streams and of human habitations; but there is nowhere any continuous range of mountains, or plateau, and (except towards its borders) the granite has been entirely denuded of the stratified rocks that once overlay it, and is now either naked or else overspread in some places with a thin covering of white sand, and in others (chiefly flats, hollows, and rifts) with a thick deposit of the fertile "terra roxa," or red loam (decomposed gneiss, mica-schist, &c.), which I have supposed to be lacustrine, but Professor Agassiz says is glacial drift.

3. *The Diamond-Region*—the elevated rocky region of Central Brazil, where the largest southern affluents of the Amazon take their rise, and where as we advance southward granite is the predominant rock. As I know nothing personally of either the geology or the botany of this region, I shall not need to say more of it at present.

4. *The Amazon Region*—middle and upper—comprising the whole course of the main river and the country adjacent to its banks, from the foot of the Andes down to the commencement of the Pará archipelago, or westward limit of the Coast-Region. As far up the Amazon as to the mouth of the Coary, or perhaps a little higher, there is stratified rock, either overlaid with alluvium in the subriparial lands, or rising into flat-topped hills—relics of a formation of horizontally stratified sandstones, 800 feet thick, that once stretched continuously from the highlands of Brazil, over the Amazon valley, the great granite flats of the Orinoco, and the Llanos of the Apure, to the coast-range of Caracas, on the borders of the Caribbean Sea; but from the Coary to the foot of the Andes the formation is (apparently) entirely alluvial.

5. *The Subandine Region*, comprising the eastern slopes of the Andes of Peru and Ecuador, up to 6000 feet, with a broad strip of the great plain at their base.

The geological formation of the oriental Peruvian Andes is chiefly triassic, having the characteristic fossils, shales, and beds of salt, of that region; but the Equatorial Andes (or so much as I have seen of them, where the river Pastasa and its tributaries issue into the plain) begin with a vast thickness of soft and apparently very recent alluvial rock overlying micaceous schists and trachyte. In the plain at their base there is much red loam—at first ridged and furrowed from north to south, but soon subsiding into a nearly uniform level*.

[It will be seen that the areas on which I have worked belong, the 1st to the Coast-Region, the 2nd and 3rd to the Mid-Amazon, the 4th to the Granite, and the 5th and 6th to the Subandine Region.]

Each of these regions has apparently several species of palms peculiar to it, some of them so abundant as to impress a special character on the forests of the whole region; but I can only mention here a few of the most striking and best-ascertained species.

§ 2. *Palms of the Coast-Region.*

The *Coast-Region* has, of peculiar species, first and foremost the strange-looking *Manicaria saccifera*, which at a distance more resembles a plantain become rigid and woody than any palm, having immense *simple* leaves—each a ready-made tile that reaches from ridge to eaves. Quite as remarkable are the large, corky, tessellated and echinate tricoccous fruits. This palm, called "Bussú" by the Brazilians, is common all about the mouth of the Amazon within the influence of tides and sea-breezes, also on some parts of the coast of Guayana; and it is said to be the "Palma-pinus maritima, barbadensis et jamaicensis" of Plukenet.

Another palm confined to the same region is the "Jupati" (*Raphia tædigera*, Mart.), *the only scaly-fruited palm of America that has pinnate leaves, all the others having fan-shaped leaves; while all the scaly-fruited palms of Asia and Africa have pinnate leaves.* It has actually two African congeners—a rare case among American palms, apparently pointing it out as a relic of some very ancient connexion between the Old World and the New. The leaves of the Jupati are among the very longest known of any plant, being 40 and even 50 feet in length.

I shall mention only one other characteristic Coast-palm, the "Mucajá" (*Acrocomia sclerocarpa*), a prickly species with edible but dryish drupes, which is not uncommon near Pará, but wherever it is met with further inland appears to have been planted;

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* I have materials for very much enlarging this meagre sketch of the mineralogy of Amazonland; but it is not necessary for my present purpose.

for it grows only in open situations near dwellings, as in the town of Santarem, which is the furthest point westward where I have seen it.

§ 3. *Palms of the Granite Region.*

The Granite Region is characterized by a very different set of palms. Where the rock is bare, or thinly covered with sand, the whole vegetation is of that peculiar kind called "Caa-tinga," or white forest, consisting of low thinly set trees and bushes, with palms of singular aspect interspersed or gregarious in clumps or patches. The most notable Caatinga palms of the Granite are *Leopoldinia Piassaba*, with its long brown beard reaching the ground and giving half-grown trunks the appearance of bears rampant, and *Mauritia* (*Orophoma*) *Caraná*, whose crown of palmate leaves rises over a huge mass of decaying persistent petioles.

Where the river-beds are of granite, as throughout this region they mostly are, only a very few being in rifts or valleys filled with alluvium, the phenomenon is seen of "aguas negras," or black-water streams, whose riparial vegetation is well characterized by the abundance of two beautiful palms, both having clustered or cespitose stems. One is the *Mauritia aculeata* of Humboldt ('Ansichten der Natur,' i. 131), not the *M. aculeata* of Martius, which is a distinct species with solitary stems, but the same species as Wallace has figured under the name of *M. gracilis*. It is a most graceful palm, the outer stems of each tuft often leaning far over the water, and the fan-shaped leaves (blue-green above, white beneath) having the laciniæ pendulous from the middle. In the other palm, *Leopoldinia major* (Wallace), the leaflets of the pinnate leaves are pendulous from the very base (as in the Euterpes), and the finely divided ferruginous spadices bear blood-red flattened drupes.

Two of the four palms above mentioned, *Leopoldinia Piassaba* and *major*, seem nowhere to extend beyond the granite region; but I have traced the two *Mauritias* down to within thirty miles of the mouth of the Rio Negro, on the small river Tarumá, where they grow in caatingas whose surface-sand reposes not on granite, but on one of the harder layers of the Amazon sandstone*.

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* Similar conditions gave rise to the recurrence of "caatingas" throughout the main Amazon; but they are much rarer than on the Negro and Casiquiari, and are sometimes replaced by scrubby savannahs, or "campos." All are interposed in the vast primeval forest, and in a climate of almost perpetual

Martius's original species of *Leopoldinia* (*L. pulchra*) has its main site on the black-water streams of the Granite Region, but extends beyond it down to the mouth of the Rio Negro, and is found also on the Trombetas, Tapajoz, and other rivers of clear water, wherever there are sandy beaches overlying hard rock. I think, however, I am justified in claiming the granite as the original site of the entire genus *Leopoldinia*, seeing that there it abounds most, both in species and individuals.

The elegant little scaly-fruited palms that constitute the genus *Lepidocaryum* of Martius seem also to have originated in the Granite Region, not on the river-banks, but in the caatinga forests, and to have spread southwards, wherever they found a similar habitat, across the Amazon to some way up the river Madeira.

§ 4. *Palms of the Subandine Region.*

The Subandine region is remarkable for being the headquarters of palms with broad premorsely-cut, and often laciniate leaflets, with which are nearly always associated a stem supported on an emersed cone of roots that resembles the spokes of a half-opened umbrella, both which features attain their greatest development in the genus *Iriartea**.

In the hill-forests of Maynas, at from two to three thousand feet elevation, *Nunnezharia fragrans*, R. et P. (*Chamædorea*, Willd.)—a delicate little palm, with stems no thicker than reeds, simple forked jagged leaves, and orange-coloured flowers, that exhale their rich and peculiar odour for years after being dried—forms no small proportion of the undergrowth.

Still more noteworthy is the noble and singular genus *Wettinia*, whereof the first species (*W. regia*) was found by Pöppig on the upper part of the Huallaga, and the second (*W. Maynensis*) by myself in the lower Maynensian Andes, whence I have traced it along the roots of the Equatorial Andes to the upper regions of the Pastasa and Napo. Its chief home is in the lowest skirts of the mountains, and it very rarely descends into the Amazonian plain. Its striking features are the root-cone, the long equably

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humidity; so that the trees are always clad with verdure; and in this respect they differ much from the "caatingas" of Central Brazil (described by St.-Hilaire), where most of the trees lose their leaves in the cool dry season (June to September).

* See Wallace's 'Palms of the Amazon,' plates 12–15.

pinnate leaves with premorse leaflets, and the hairy fruits densely packed on whorled spadices.

After *Wettinia* comes the allied genus *Iriartea*, consisting of several species, all of which abound most in the roots of the Andes, and a few descend a good way into the plain, but only one extends right across the continent to the Atlantic ocean. The original species, *I. deltoidea* (R. et P.) grows in the hills along with the Wettinias, but seems to ascend higher, and never to descend into the plain: its range in latitude is from about 0° to 10° S. Further south are other two Subandine species, *I. Orbigniana* (Mart.) and *I. phæocarpa* (Mart.); and northward, in the Andes of New Granada, other species have been found by Karsten.

Iriartea ventricosa (Mart.), the noblest species of the genus, known from its congeners by the fusiform swelling, or belly, midway of its trunk, has also its chief site in the lower Oriental Andes, where it ascends to about 5000 feet. It is especially abundant in the Forest of Canelos, near the equator, growing along with *Wettinia Maynensis*, but reaching a greater elevation. The most palmy hill I ever saw is a long steep ridge, rising from the right bank of the river Pastasa, at about 3500 feet, to a thousand or more feet above it, and it is almost entirely clad with *Iriartea ventricosa.* This palm abounds also in Maynas, where it has given its Peruvian name, "Tarapoto," to one of the most flourishing of the modern towns. Thence it descends into the plain, and spreads across the Granite Region eastward to the very sources of the Orinoco, and down the Amazon and the Rio Negro to within perhaps a thousand miles of the Atlantic coast, but is entirely absent from the lower Amazon.

A much lowlier species, *I. setigera* (Mart.), whose stems furnish most of the blowing-canes used in Amazonland, appears to begin at the foot of the Equatorial Andes, only where there is granite, and to extend over the whole Granite Region, and down the Japurá, Uaupés, and Negro to the Amazon; but I have not heard of it below the mouth of the Rio Negro.

The last *Iriartea* to be mentioned is *I. exorrhiza* (the "Paxiuba" of the Brazilians), which begins in the Oriental Andes along with *I. ventricosa* and the Wettinias, but extends eastward far beyond their range to the very mouth of the Amazon, and north and south across the entire breadth of the Amazonian forest. Thus, out of six species of *Iriartea* known to grow about the head-waters of the Amazon, this is the only one that extends downwards to its mouth, where it grows quite as abundantly as in the Andes.

The Ivory-palms (*Phytelephas*) are also truly Subandine, abounding in the roots of the Andes, and descending along the course of the rivers in some cases a few hundred miles; but as they belong rather to Pandanaceæ than to Palmaceæ, I shall treat of them separately in an appendix.

An extract from my diary, under date May, 1857, describing the palm-vegetation of a bit of forest on the river Bombonasa, in the roots of the equatorial Andes, lat. 1½° S., alt. about 1200 feet, will give an idea of the grouping of Subandine palms.

"The most abundant palms were *Mauritia flexuosa*, *Wettinia Maynensis*, *Iriartea exorrhiza*, and *ventricosa*, and *Œnocarpus Batauá*. *Euterpe oleracea* was not unfrequent on the very margin of the river; and in the depths of the forest the smaller Ivory-palm (*Phytelephas microcarpa*) formed groves, sometimes growing along with *Iriartea ventricosa*. Another palm was a large *Astrocaryum* (*A. vulgari* proximum). The undergrowth included several small palms:—*Bactris* humilis, pinnis paucis longe cuspidatis; *Geonomæ* duæ, altera foliis basi rectangulari-cuneatis apice emarginato-bifidis, *G. Porteanæ* valde similis, etc.; besides some Cyclantheæ, such as *Discanthus odoratus* and various *Carludovicæ*. On the steep alluvial banks grew two other *Carludovicæ*, one of them the "Bombonaje" (*C. palmatæ* aff.), of which straw hats are made."

It would be very interesting to compare the palms of the eastern slopes with those of the western slopes of the Equatorial Andes, separated as they are by a double range of lofty ridges and snowy peaks; but there do not yet exist materials for it. In my journey down the western side of the Andes, all I could do was to note that palms were less abundant than on the eastern side, that they consisted apparently of the same genera, *Ceroxylon*, *Geonoma*, *Euterpe*, *Bactris*, *Attalea*, &c., but of species entirely distinct. Even the Ivory-palm (*Phytelephas æquatorialis*) that abounds on the western side of the Andes proves to be quite different from both the species on the eastern side, as I shall show more fully in the sequel.

§ 5. *Palms of the Amazon Region.*

The Amazon Region proper abounds in Palms quite as much as the regions that border it on all sides, but seems to have derived most of its species from them—its Iriarteas from the

Andes, its Leopoldinias and Lepidocaryums from the Granite, and so on. It must, however, have existed for untold ages so nearly in its present state that it ought to have acquired special forms of its own, like the other regions; and yet I am unable to point out any such with certainty.

That noble palm *Maximiliana regia*, "Inajá" of the Brazilians, "Cocurito" of the Venezuelans and of Humboldt, one of the most conspicuous ornaments of the primitive forests of the Amazon, is still more frequent in the Casiquiari Region, and (besides being dispersed over the whole plain) is commonly seen perched on the granite peaks, wherever there is a ledge or hollow on which the decay of less noble vegetation has furnished a matrix for its roots, up to a height of 2000 feet at the least. It probably existed there at a period when the surrounding low country was one great lake, or a series of lakes, out of which stood these island-peaks. As we near the Andes, it becomes much scarcer.

I have thought that *Astrocaryum Jauarí*, a prickly palm of forbidding aspect, fond of growing on low islands and by river-sides, might be considered characteristic of the Middle and Upper Amazon; for it only begins to appear at nearly 400 miles from the mouth of the river, and extends thence upwards almost to the Andes. But on ascending the northern tributaries of the Lower Amazon, such as the Trombetas, we soon fall in with the Jauarí; and it grows more frequent when we reach the rapids, where the river-bed is of granite. It is the same on the Rio Negro; and as I have seen this Palm so abundant on the Uaupés, the Casiquiari, and the Upper Orinoco, in the centre of the Granite Region, I can hardly doubt that there is its true home.

Its nobler congener, *Astrocaryum vulgare*, the "Tucúm" of the Brazilians, is almost equally common in dry forests throughout the length and breadth of the great plain, which it seems to have reached from the campos of Central and Eastern Brazil, where, as we learn from Martius, it abounds even more than in the forests of the Amazon*.

§ 6. *The Scaly-fruited Palms of Equatorial America.*

All the Palms of the Amazon valley that have fan-shaped palmatifid leaves have also scaly or loricated fruits. They are species of *Mauritia* and its subgenera *Orophoma* and *Lepidocaryum**. But beyond the great forest, on the campos of Brazil and the llanos of Venezuela, most of the fan-leaved Palms have naked fruits, and belong to *Copernicia* and other genera of *Coryphinæ*; and a little further to north and south the Mauritias fail altogether, although fan-leaved Palms continue to be found far into North America, and southward into Paraguay.

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* A few additional facts, bearing on the distribution of the genera and species, will be found in the descriptive portion of this memoir.

The most universally distributed palm throughout the basins of the Amazon and Orinoco, or, say, from the Andes of Peru and New Granada to the shores of the Atlantic, is undoubtedly *Mauritia flexuosa* (L.); and there are few palms about which so much has already been written. The earliest American voyagers and missionaries noted its abundance in the delta of the Orinoco, and how, in the season of inundations, the natives dwelt on stages supported by the growing trunks of the *Mauritia*, whose fruit afforded their chief food; so that to them it was truly the "Arbol de la Vida," or Tree of life.

Every reader of Thomson knows the lines,—

"Wide o'er his isles the branching Oronoque
Rolls a brown deluge, and the native drives
To dwell aloft on life-sufficing trees,
At once his dome, his robe, his food, his arms"†.

At the mouths of all the rivers between the Orinoco and Amazon the *Mauritia* abounds, but does not seem to reach much further southward along the coast of Brazil. I can now say, from personal observation, that it extends westward right across the continent to the first undulations of the Andes, where it fails at from 2000 to 3000 feet, and that it is equally common in the Subandine and in the Submaritime regions, as well as along the whole course of the Amazon and Orinoco.

At the mouth of the Amazon, the *Mauritia* abounds most on the shores of low flat islands, and about swampy lakes. It is common all the way up the river on low shores, where it stretches in long avenues—and at the debouchures of the tributary rivers and creeks, where it forms groves.

At the opposite extremity of the Amazon valley, on the river Pastasa, the greater part of whose course lies a little without or eastward of the first ranges of the Andes, we find long strips of the same *Mauritia* stretching parallel to the river, and occupying low land inundated in the rainy season to a slight depth—with an intervening narrow strip of dry land next the river, evidently formed of alluvial sediment deposited by the river when its floods were higher than at present, and rarely more than a foot or two above the present high-water mark, yet clad with lofty trees of types that pertain almost exclusively to terra firma. The Mauritia-swamp still communicates with the river, and partly derives its standing water from it through the mouths of creeks that enter it at short intervals.

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* See in the sequel for a further account of these Palms.

† 'Seasons,' Summer, *l.* 833–7.

Far away northward of the Amazon, at the head of each of the "caños," or rivulets, that run into the Upper Rio Negro and Orinoco, there is a swamp where the predominant vegetation is *Mauritia flexuosa,* if the soil be good; but if it be thin and sandy, then probably the curious *M. Caraná* takes its place, or grows along with it.

Near the cataracts of the Orinoco, the savannahs are adorned with small groves of *Mauritia flexuosa* (oases in the sandy but by no means desert plains), and here and there with a long winding double line, which marks the course of a rivulet. The shade of the enormous leaves, and the drip from them, often surround each stem of Mauritia with a little pool or morass of its own, which is best seen on the savannahs of the Upper Orinoco—for instance, on that which stretches from the village of Esmeralda to the foot of Mount Duida, where numerous plants of *Mauritia* are scattered singly over the wide plain.

In the Lower Oriental Andes, it is fond of growing near springs, where it finds the necessary moisture, and aids in maintaining it by protecting the springs from evaporation. The inhabitants take advantage of this property to plant Mauritias near their wells of water; whence the Peruvian name of the Palm, "el Achuál," is often applied also to the well it overshadows and protects.

The prevalent opinion, or rather superstition, throughout Amazonia and Guayana is, that the Mauritia has the power of attracting water to itself wherever planted. This is what Velasco says of it in his 'Historia Natural de Quito,' p. 73 :—"The Palm Aguáshi (or Achuál) has the property of drawing water to it, from whatever distance; so that this Palm is nowhere seen without a spring of water at its foot, or some rivulet close by. The reason of this is not that it will not grow except where there is water, but because water can never be wanting where it grows. With the certainty of this, when any spring has dried up, the Indians of Maynas plant one of these Palms, and the water soon wells up again. In whatever part of the forest, high or low, they descry a Palm of this kind, they go up to it, assured of finding delicious water at its foot."

Humboldt heard the same thing at Esmeralda, where, in 1853, I saw the Mauritia still growing as abundantly as he had seen it half a century before me, although the human inhabitants had almost disappeared. "The trees," he says, "preserve the moisture of the ground by their shade; and hence the Indians say that the Mauritia draws the water round its roots by a mysterious attraction. . . . . . Thus the untutored child of nature confounds cause and effect"*.

The only edible part of the fruit of the Mauritia is the rather thin orange pulp, which easily separates from the endocarp when ripe, but is clad with cartilaginous scales that it requires practice to get rid of. The Indians of Venezuela are fond of it, eating it with or without cassava, and find it quite sufficient to sustain life for a considerable time without other food. I used to think it insipid, but I rather liked the "yucuta," or wine, prepared from it.

At Maypures and elsewhere on the Orinoco, when the fruit of the Mauritia is ripe enough to fall of itself, it is gathered up, the pulpy covering is rubbed off and kneaded into a mass, which is wrapped up in fresh leaves of "Platanillo" (*Uraniæ* sp. ?), and enveloped in a framework of slips of Blowing-cane Palm (*Iriartea setigera*), made first into a cylinder, and then the ends brought together and tied tightly, so as to bring it to a spindle-shape. In this way the pulp is kept for weeks, until it becomes intensely acid. When used, it is mixed with water and passed through a sieve, which retains all the scales of the fruit; and a little sugar or molasses being added, it makes a pleasant cooling drink, which, like the wine of the "Seje" (*Œnocarpus Bataua*), is eminently diuretic and slightly laxative.

Bundles of this "Moriche curtido" (as it is called) are sent for sale up to San Fernando de Atabapo, the capital of the canton, where it is much esteemed.

The Guahibos, Yarurus, and other Indians who roam over the wide savannahs between the Vichada and Meta, and use no canoes, often extemporize a raft from the stout petioles of the Mauritia when they have a river to cross.

The chief native names of the Mauritia are "Ita" on the coast of Guayana, Moríche" in Venezuela, "Mirití" in Brazil, "Achuál" and "Aguáshi" in Peru.

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* 'Aspects of Nature,' Sabine's Transl. i. p. 181.

§ 7. *The Cultivated Palms of Equatorial America.*

In the course of my South-American travel I have seen only two Palms cultivated to any extent, viz. the common Cocoa-nut Palm (*Cocos nucifera*, L.) and the Peach Palm (*Bactris Gasipaës*, H., B., K., =*Guilielmia speciosa*, Mart.).

It is curious that, of the earliest Spanish writers on the natural history of the New World, those who knew only the eastern side of the continent, the West-Indian Islands, and Mexico, such as Hernandez and Oviedo, assert that the Coco Palm was introduced into America by the Spanish settlers; while those who were familiar with the Pacific coast, including some of the earliest travellers in Peru, such as Cieza de Leon, say positively that it was already found growing on that coast, especially in the equatorial regions, when the Spaniards first arrived there. It is possible that all spoke truly, according to their knowledge, and that, although this palm may be indigenous only to the islands of the Pacific Ocean, it had really reached the western coast of America, either by accident or design, long before the advent of the white man.

Velasco, in his eagerness to vindicate his country's claim to the "Hatun-Chonta," or Great Palm, as the Indians call it, gets very angry with those who dispute it. "One may see," he says, "with what levity some authors relate a thousand falsehoods, like Francisco Hernandez, a native of Mexico, who in his Latin history asserts that Cocos were transplanted from the East to the West Indies by the Spaniards; whereas on their first arrival they found Cocos laden with fruit, which is never seen on stems less than from 16 to 20 years old"*.

The cultivation of the Cocoa-nut is limited to the regions bordering the Atlantic and Pacific Oceans. As we ascend the Amazon it gradually becomes sterile. At Manaos, 800 miles up, the fruits appear fully formed externally, but are invariably empty. At San Carlos del Rio Negro, almost exactly midway between the two oceans, there were, in 1854, two well-grown Coco Palms which had never even flowered.

The second palm, cultivated in the regions of the Amazon and

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* Hist. Nat. de Quito, p. 54. Hernandez, 'Plantarum, Animalium, &c., Megicanorum Historia,' lib. iii. cap. 40.

Orinoco, is an undoubted native; for it belongs to a genus (*Bactris*) unknown out of Tropical America. It is the *Bactris Gasipaës* of Humboldt and Bonpland (Nov. Gen. i. p. 302, t. 700), but better known by Martius's name, *Guilielmia speciosa* (Palm. 82, t. 66, 67), an untenable name, as it seems to me; for *Guilielmia* is undistinguishable as a genus from *Bactris*, and "*speciosa*" is not the original specific name. Be this as it may, the palm is well known by its Brazilian name of "Popunha," and as the "Peach Palm" of Humboldt, whose vivid description of it, as he saw it growing at San Fernando de Atabapo, will be familiar to most readers.

The clustered stems of the Peach Palm grow to 60 or even 90 feet high, and are thickly armed with long prickles. The numerous curling and drooping leaves rarely exceed 7 feet, and they have from fifty to sixty leaflets on each side, aggregate by threes and fours and pointing in all directions. The fruits are massed into large pendulous corymbs; and if from their size and vivid colours of yellow and red they may be likened to a well-ripened peach, in shape they more resemble a hen's egg, although usually rather more conical. The thick firm flesh is mealy when cooked, something between a potato and a chestnut in flavour, and superior to either. A seedless variety is common; but the fruits are much smaller and contain no more edible matter than those that have a stone (or endocarp) at the centre.

Such is the Peach Palm; and now as to its origin. I first saw a few plants of it at Manáos, within the mouth of the Rio Negro; and on ascending towards the head-waters of that river, and especially on its tributaries the Uaupés and Casiquiari, I saw it growing abundantly in every Indian village—as also on the Atabapo, and on the Orinoco itself above the cataracts. At San Fernando Humboldt heard it called "Pirijao" and "Pihiguao;" but the Venezuelans now write and pronounce "Pijiguao." I tried in vain to find a root for this name in any of the native languages; and when I asked the people where they supposed the palm had originally come from, they pointed westward and said, "From the Cordilleras;" and I got a similar answer from the natives of the Uaupés.

When at length I reached those Cordilleras, and travelled along their eastern foot from 7° S. latitude to the equator, I found, indeed, the Peach Palm very abundant, but still only in the neighbourhood of habitations, and always a cultivated plant. If, however, I remained in as complete ignorance as before of its true native country, I saw at once that the Venezuelans, along with the plant, had got also its name from the Andes, but travestied; for the Peruvians call it (in their native quichua) "Pisho-guayo," *i. e.* Bird-fruit, whence to "Pijiguao" the transition is easy.

This is not its only Andine name; for it is also very commonly called "Chonta-rúru," *i. e.* Palm-egg or Palm-fruit (which indeed applies to the fruit of all Palms, but is considered to pertain to the Peach Palm *par excellence*)—and also "Chonta-dura," although this name belongs rather to the wood, which is black and tough and takes a fine polish, and is the usual material for lance-shafts among the Jibaro and Zaparo Indians. Humboldt heard the Peach Palm called "Chontadura" at Popayán, on the western side of the Andes of New Granada, where also it appears to have been cultivated*.

Although I am compelled to leave the native country of the Peach Palm doubtful, I quite expect the wild plant will still be met with in some unexplored recess of the Oriental Andes, perhaps with the fruit so much smaller and drier than what it has become by long cultivation as to be not easily recognizable.

§ 8. *The Heights attained by Palms in the Amazon Valley.*

I shall supplement this chapter by saying a few words on the height of palms. Humboldt having seen at some points of his South-American journey the crowns of palms standing so completely above the surrounding forest as to give the idea of "a forest above a forest," *that* has been rashly assumed by some writers to be a universal characteristic of American palms. A traveller approaching by sea the cities of Panamá, Guayaquil, and many others within the tropics, will see groves of Coco-palms towering far above the bushy spreading Mangos and Ingas that nestle at their base; but the latter are by no means forest-trees, nor is the Coco a forest-palm. Let him, however, leave the coast and penetrate the virgin forest beyond, and he will see that the loftiest palms do not usually exceed the exogenous trees of average height, and that, except on the river-banks, they are often quite hidden from view until closely approached. From some of the naked-topped granite hills of the Rio Negro and Orinoco, and from the ascent of the eastern side of the Andes, I have looked over perfect oceans of forest, and am able to assert that very rarely do palms domineer over all other trees—so rarely, indeed, that I believe I have only noted it twice, and that on a very limited area, during the whole course of my travels. On the contrary, the foliage of a grove of gregarious palms, such as the Piassaba and the great Caraná, is usually depressed below the top of the surrounding forest.

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* "Chonta" is the Peruvian word for "Palm." In Maynas the common word for "fruit" is "guáyo (huáyu)," in Canelos "rúru." Velasco says "*Fruit*, in the language of Peru, is called *ruru*, and in that of Quito *lulun*, which also means 'egg;' hence the fruit of any Palm is called *Chonta-ruru*. And it is to be noted that sometimes the fruit is taken for the whole tree, and the tree for the fruit, as happens also in other languages" (*l. c.* p. 53).

In faithfully recording my own experience, I have no thought of impugning the testimony of other, and no doubt equally conscientious observers. Humboldt and Bonpland assure us that they saw Wax-palms (*Ceroxylon andicola*) 180 feet high in the cool forests of the Andes of New Granada, and therefore no doubt surpassing every other tree in their neighbourhood. Dampier, in his graphic account of Campeachy, says, "As the [Silk] Cotton is the biggest tree in the woods, so the Cabbage-tree [or palm] is the tallest; the body is not very big, but very high and straight. I have measured one in the Bay of Campeachy 120 feet long as it lay on the ground; and there are some much higher. . . . . . Those trees appear very pleasant, and they beautify the whole wood, *spreading their green branches over all other trees*"*. Here he plainly speaks of the appearance of the forest from the sea; and his testimony does not contradict my own; for I concede that the low forest, such as usually grows at the swampy heads of bays and along inundated river-margins, is overtopped by Cocos, Mauritias, and other maritime and riparial palms.

It only remains to adduce the measurements on which the foregoing conclusions depend. The loftiest forest-trees of the Amazon valley do not exceed 200 feet in height. The tallest tree from which I ever gathered flowers was about 140 feet; but I have measured a prostrate tree that was 157 feet long; and having previously lost the top, that would have made the entire length 10 to 20 feet more, or, say, 170 feet. But I have trustworthy testimony from the late Messrs. Campbell, of Pará, and others, that Silk Cotton-trees (*Eriodendron Samauma*, Mart.) and Pará-nut trees (*Bertholletia excelsa*, H., B., K.) have been cut down measuring full 200 feet, which is, indeed, very credible from the height to which they are seen towering over all neighbouring trees. From these, and many other instances, I conclude that the real patriarchs of the primeval forest range from 120 to 200 feet high.

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* Travels, vol. i. p. 165.

The tallest palms I ever cut down were of three species—*Mauritia flexuosa*, *Euterpe oleracea*, and *Iriartea ventricosa*; the entire height of each of which was about 80 feet. But my object being to obtain specimens of the leaves, flowers, and fruit, I naturally selected the most accessible, not the loftiest, and in every case I saw palms of the same species, standing near, fully half as high again as the one I had cut down. Altitudes of the loftiest of these palms, and of *Œnocarpus Batauá*, taken with a sextant, never exceeded 120 feet. *Cocos nucifera* rarely exceeded 100 feet; and persons who have seen this palm also in the East assure me that in the New World its dimensions fall much below what it attains in the Old.

Comparing these two groups of data, it will be seen how very rarely in Amazon forests palms can overtop and "spread their green branches" above all surrounding trees. But if neither trees nor Palms grow so exceedingly lofty there as they do in some other parts of the world, there can be little dispute that they excel those of all other regions in beauty and infinite variety. To fully appreciate this, the botanist should travel, as I have done, from the mouth of the Amazon to its sources in the summits of the Andes,

> "Through palmy shades and aromatic woods,
> That grace the plains, invest the peopled hills,
> And up the more than Alpine mountains wave."
>
> THOMSON, *Summer*, l. 763–5.

CHAPTER III.

ON THE CLASSIFICATION OF THE GENERA OF PALMS.

§ 1. *Palms have been divided into Five Tribes, of rather indefinite character* *.

For the purpose of describing the few Palms of my own gathering, it will not be necessary to take the whole Order into consideration, nor to attempt to remodel existing genera and their distribution into Tribes; but I will string together a few observations of my own, compare them with those of other botanists, and thence try to show how a more satisfactory and natural arrangement of Palms may be arrived at.

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* Confer Kunth, 'Enumeratio Plantarum,' vol. iii. p. 168 *et seq.*; Endlicher, 'Genera Plantarum,' pp. xi et 244; Martius, 'Genera et Species Palmarum.'

The tribes into which the order of Palmaceæ has been divided, although constituting, with a few exceptions, natural groups of genera, have been founded chiefly on supposed, but not very real, differences in the structure of the ovary and fruit. The first Tribe, *Arecinæ*, is said to have an " ovarium e carpidiis 3, rarius 2, *primitus connatis*, 3- vel 2-loculare, rarissime carpidio unico 1-loculare. Fructus baccatus."

Tribe IV., *Coryphinæ*, has also usually baccate fruit; but the ovaries (carpels) are said to be "*primitus distincta*."

Tribe III., *Borassinæ*, has nearly always drupaceous fruit: "drupa 1–3-pyrena indivisa vel lobata, interdum bacca monosperma;" and the ovary is said to be 2–3- (rarely 4-)celled.

Of Tribe II., *Lepidocaryinæ*, so well distinguished by its scaly fruits, and Tribe V., *Cocoinæ*, by its symmetrical triforaminate endocarp, more anon.

Now, if we conjoin Tribes III. and IV., and eliminate therefrom a few genera (*Geonoma*, *Phœnix*, &c.) to be added on to Tribe I. (*Arecinæ*), we get (from the three) two tolerably natural groups; but their true characters are by no means those above stated.

§ 2. *The Ovaries of all Palms consist normally of three Carpels.*

On examining and comparing the ovaries of Palms, we shall find that their normal condition is to have three carpels (" carpidia " of Martius, Endlicher, &c.), four or five only by rare exception, and fewer than three only by abortion. Even in *Geonoma*, which has the ovary usually reduced to a single uniovulate carpel, the trifid style, arising from the base of the ovary on the inner side, betrays the triple nature of the ovary; and on exploring a good many female flowers of any species of Geonoma, we shall be almost certain to find one or more ovaries consisting of three carpels united at the base to a central style, the two sterile ones either persisting as minute warts at the base of the fertile carpel, or disappearing altogether when the latter is ripe*.

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* It will be seen from this that *Geonoma* has been described quite hypothetically to have " a trilocular ovary." I first satisfied myself of its true nature in 1852, when collecting at the cataracts of the Rio Negro; and I have fully described the similar structure of *Wettinia* in the Linnean Journal for April,

In *Wettinia*, a genus formerly banished from the true Palms, and described to have a perfectly simple ovary, I have invariably found three carpels, combined only at the very base, whereof the two sterile ones remain adhering as two knobs at the base of the ripened fertile carpel. In *Nunnezharia* also the three carpels are very obvious, and the sterile ones persist after the same fashion.

§ 3. *Palmæ Exocarpicæ, or Palms which have the sterile carpels excluded from the pericarp of the ripe fruit.*

In most of the Arecinæ, then, in some Coryphinæ, &c. the normal condition is to have an ovary of three carpels, either entirely separate, or joined from the base up to a greater or less height, but very rarely quite to the summit, three styles, nearly always combined into one, and springing from the centre of the ovary or from the point of divergence of the carpels, with as many distinct stigmas. In most cases only one carpel is fertile, and in ripening it swells chiefly at the outer circumference, scarcely at all at the inner; so that when ripe, the style and the abortive carpels remain adhering to the inner face, or to the very base, of the fruit, or their former site is indicated by a lateral scar; but they do not grow along with the fertile carpel into a 3-celled fruit with two empty cells. This group we may be allowed to call "Exocarpicæ"*.

§ 4. *Palmæ Endocarpicæ, or Palms which have the sterile carpels included in the pericarp.*

But in what we may call "Palmæ Endocarpicæ," the carpels are, from the first, united to the very apex, and have a terminal style, or three terminal sessile stigmas; the ripe fruit is symmetrical, and the carpels are combined within a single endocarp, which is marked (usually towards one end) with as many foramina as there are carpels†. When, as is usually the case, only one of the carpels is fertile, then the foramen opposite to that carpel is open and the others are closed (*foramina cæca*); but if two or three of the carpels be fertile, then the endocarp has as many true perforations.

1859. In mentioning this I put forth no claim to a first discovery. Other cautious observers must have seen the same thing, possibly before I did.

* Martius and Endlicher express the exocarpic structure by "Fructus endocarpio cujusvis carpidii distincto, aut abortivorum a fertilis formatione excluso."

† "Fructus monopyrenus, sæpissime unilocularis, loculis abortivis in fertilis putamine seu endocarpio inclusis." (Mart., Endl.)

This structure has been considered to pertain only to the fruit of the *Cocoinæ*, whose black bony endocarp renders it very conspicuous; but it seems to me to exist also in other palm-fruits, which have the stigmas at the geometrical apex of the ovary and fruit, but in which it is detected with greater difficulty, on account of the endocarp being a membrane of extreme tenuity.

§ 5. *Tribes are insufficiently characterized by variations in the Exocarpic Structure.*

If we consult and compare the characters of the genera of Palms, as given by Kunth and Endlicher, we shall see that every possible modification of the exocarpic structure occurs in Arecinæ; and the same thing, with a little limitation, is to be remarked of Borassinæ and Coryphinæ. The contrast of "carpidia primitus connata" in Arecinæ, and "carpidia primitus distincta" in Coryphinæ, is found to have no existence. In *Corypha* itself, and in *Copernicia*, I find the carpels from the first combined to a greater or less height. If in such Coryphinous genera as *Chamærops*, *Thrinax*, and *Rhapis* the carpels are distinct to the very base, so also are they in the Arecinous genera *Geonoma*, *Wettinia*, *Nunnezharia*, &c. The exocarpic character serves, in fact, to unite, not to separate, the tribes Arecinæ, Coryphinæ, and Borassinæ. To distinguish them, if distinction there be, we must seek elsewhere.

§ 6. *Homologies of the Pericarp of Palm-fruits.*

I must here interrupt my quest to remark that the nomenclature of the fruits of Palms requires to be put on a firmer basis; for in a multitude of cases what one author has called a "drupe" another calls a "berry;" and if it be admitted that there may be both dry drupes and dry one-seeded berries, the distinction will be reduced to depend on the nature of the endocarp, not on its presence or absence; for I believe it is always present in some shape or other. The number of separate (or separable) envelopes is by no means the same in the pericarps of all palms, some having apparently only two, others three, and many four, each of which may consist of several laminæ that are themselves sometimes easy to separate, besides the envelopes of the seeds, or "nucleus," as it has been called.

In the Yagua Palm (*Attalea Humboldtiana*, sp. n.) the envelopes of the drupe are:—(1) a thin brown skin, or epicarp, clad with deciduous lepra; (2) several separable fibrous laminæ forming a layer 1½ line thick; (3) an equal thickness of similar but stouter fibrous laminæ adhering into a woody mass or outer shell; (4) the true endocarp, ¾ line thick, black, bony, and with difficulty separated from the outer envelope.

The thin mesocarp of *Iriartea exorrhiza* is separable into two or three fibrous layers, and that of *Œnocarpus minor* into many such layers. In the latter the laminæ are flabellately veined, the simple veins (fibres) radiating from the base to the apex.

In *Leopoldinia minor* and *L. Piassaba*, besides the fleshy mesocarp next the skin, there is an endocarp consisting of a great many separable layers, whereof the outermost is entirely composed of stout woody interwoven and anastomosing veins or fibres; while the inner layers get gradually thinner, and the veins merely cross without anastomosing, until the innermost is a delicate almost veinless membrane.

It might safely be inferred, from *à priori* considerations alone, that the layers of the pericarp were modified leaves; but their true homology is made most clear by the structure of the fruit of *Leopoldinia*, where the laminæ are exactly miniature counterparts of the reticulated petiole-sheaths. In the genus *Bactris* the characteristic striæ of the leaf-sheaths are reproduced on the epicarp, and the aculei on the endocarp, as I shall have to describe more fully in the sequel. The pericarp, then, is composed of imbricated rudimentary leaves, whereof the blade is undeveloped or reduced to a minimum. Even the raphe, with its thin white veins netting over the testa, is but a modified leaf-sheath, a sort of ovular bract subtending the ovule from its first appearance, and growing with its growth.

§ 7. *The Scales of the loricated fruits of the Tribe Lepidocaryinæ are rudimentary Leaf-blades.*

But in *Mauritia* and other *Lepidocaryinæ* the carpophylla, or fruit-leaves, consist not only of a sheath, but of a rudimentary blade, at first a minute erect scale, but after fertilization becoming retrorse, and clothing the ripe fruit with shining rhombic scales that give it a beautiful loricated or tessellated appearance, and liken it to a fir-cone. Dissection affords ample proof that these scales are really the homologues of the fan-shaped leaf-blade of *Mauritia*.

§ 8. *Palm-fruits are all formed on one general plan, with many partial modifications, which cannot well be classed under only two heads.*

Hence, while it is plain that all Palm-fruits are constructed on the same general plan, and might therefore be well designated by a single name ("drupa"), there are modifications of structure which seem to require the invention of new terms for them, and are not at all sufficiently distinguished by calling some fruits "drupes" and others "berries," as is rendered plain by the contradictory use different authors have made of those terms.

§ 9. *All Palms may be brought under Two nearly equal but somewhat artificial Divisions, by the Æstivation of the Corolla of the Female Flower.*

To resume the question of classification. If we seek to divide the entire order of Palms into two great groups by contrasting a single pair of characters, we find it readily in the corolla of the female flower; for, while throughout the order the petals of the male flowers are uniformly valvate in æstivation, and often more or less united into a gamopetalous corolla, there is a very large assemblage of genera which has the petals of the female flowers also valvate, and another almost equally large which has them widely imbricated. The division of *Valvatipetalæ* includes all the *Lepidocaryinæ*, all the true Borassinæ and Coryphinæ (namely, those that have fan-shaped leaves), *Geonoma, Calyptronoma, Leopoldinia,* and other *Arecinæ*, chiefly of humble growth, and all the prickly *Cocoinæ* except *Acrocomia*; while the second division, or *Imbricatipetalæ*, comprises all the unarmed *Cocoinæ*, most of the taller-growing Arecinæ (such as *Areca, Euterpe, Œnocarpus, Iriartea,* &c.) together with *Phœnix* and a few other pinnate-leaved genera that have hitherto been tacked on to *Borassinæ* and *Coryphinæ*, where they are quite out of place.

This breaks up *Arecinæ*; but the genera (such as *Œnocarpus* and *Oreodoxa*) thus brought into juxtaposition with *Cocos* and *Attalea* have undeniably some degree of affinity, and often much general resemblance to them. There are even some species of *Œnocarpus* with symmetrical fruits and apical stigmas, as in *Cocos*, contrary to the general character of the *Arecinæ*, which is to have excentric fruits. The greatest objection, however, to making these differences in the female flower the positive basis of a primary division of the order is, that we thereby separate two genera so very closely related as *Wettinia* and *Iriartea*, the former having valvate and the latter imbricated petals in the female flower—and also *Acrocomia* (which has an imbricated female corolla) from the rest of the prickly *Cocoinæ*, which have valvate corollas.

While, therefore, I should take the æstivation of the female corolla as the best possible basis of an artificial analysis of the genera, I could not repose a natural arrangement upon it.

§ 10. *Palms are more naturally divided, from the Spathes, into Spathifloræ and Spathellifloræ.*

Another pair of characters, one that is thoroughly natural and easily seized upon, may be derived from the spathes. It divides all Palms into what I would call "Spathifloræ" and "Spathellifloræ," whose characters are the following:—

SPATHIFLORÆ. *Spadices* either simple or vaguely branched, never truly pinnate; if compound, then paniculate; if simply branched, often scopæform.

Spathes (one or more) inserted on the peduncle; at first fusiform, entire, and completely including the young spadix; then bursting for the emission of the spadix, which usually lengthens considerably (as the flowers and fruits advance to maturity) in the palms with deciduous spathes, but rarely ever exceeds, or even equals, the woody persistent spathes of other palms. Except for these general envelopes, the rhachis and branches of the spadix are nearly naked, the bracts subtending the branches and flowers being generally reduced to mere scales.

SPATHELLIFLORÆ. *Spadices* pinnately branched, branches distichous and alternate; if again divided, then the ramuli also distichous.

Spathes usually none; but the peduncle, rhachis, and branches completely hidden by tubular distichously imbricated bracts (*spathellæ*), which are oblique-mouthed, and sometimes widened upwards (cyathiform).

The *Spathellifloræ* include all fan-leaved Palms, whether *Borassinæ*, or *Coryphinæ*, or *Lepidocaryinæ* of Martius and Endlicher, and both fan-leaved and pinnate-leaved genera of *Lepidocaryinæ*, All other Palms are *Spathifloræ*.

The scaly fruits of the *Lepidocaryinæ* mark them well out from the rest of the *Spathellifloræ*; and it is here that the only aberrations from the typical character occur—two Eastern genera, *Ceratolobus* and *Dæmonorops*, having complete spathes as well as spathellæ, while the spadices are paniculate. But this is only one of those instances of transition to a more universal type which beset all our systems.

§ 11. *The Tribes and Genera of Palms* (*and of all other plants?*) *are imperfectly characterized if the Structure of the Leaves be not taken into consideration.*

In classifying Palms I should like to avail myself of the important characters afforded by the foliage. In this case, as in that of other groups of Phanerogams, we seek for recondite features in the flowers and fruits, and shut our eyes to, or at least leave out of our generic and tribual characters, the very obvious and often constant characters afforded by the leaves—ignoring the fact that in all stable groups, whether of higher or lower rank, there should be some correlation of structure in every organ, which it is the systematist's part to trace out and rate at its true value. I do not here attempt to follow out my notions to their results, because I have been unable to reexamine many of the larger-fruited even of the American Palms, without which I cannot venture to decide on some presumed affinities. For my present purpose the following conspectus will sufficiently characterize the few genera with which I shall have to deal; and for further elucidation I must refer to the detailed accounts of the genera and species which follow.

§. 12. *Conspectus Generum Palmas Spruceanas complectentium.*

SPATHIFLORÆ. Spadix vage ramosus simplexve, primum spathis universalibus (una pluribusve) pedunculo adnatis obvelatus. Folia simplicia bifurca, pinnatisecta vel pinnata. Fructus esquamatus.

- Carpella (plerumque 3) distincta vel plus minus alte coalita, sæpissime unicum fertile, maturatum asymmetricum, duobus sterilibus e fertilis pericarpio exclusis.
    - Corolla ♀ gamopetala vel petalis valvatis constans.
        - Calycis utriusque sexus sepala imbricata. Spathæ 2.
            - Stamina 6; filamenta in tubum coalita; antheræ loculi lineares omnino discreti. Baccæ haud compressæ. GEONOMA, *Willd.*
            - Stamina 6; filamenta sublibera; antheræ orbiculares dorsifixæ. Drupæ insigniter compressæ. LEOPOLDINIA, *Mart.*

Calyx utriusque sexus gamophyllus vel sepalis valvatis constans. Spathæ 3 vel plures.

Spadices solitarii. Stamina 6, raro 9. Andrœceum floris ♀ 0. Baccæ glabræ nitidæ.

NUNNEZHARIA, *R.* et *P.*

Spadices verticillati simpliciter ramosi, ramis tenuibus. Andrœceum fl. ♀ filamentis 6 constans. Baccæ glabræ ....MORENIA, *R.* et *P.*

Spadices verticillati simplices vel ramosi, ramis validis congestis. Stamina 12–16. Baccæ villosæ.

WETTINIA, *Pöpp.* et *Endl.*

Corollæ floris ♀ petala late imbricata.

Spathæ plures. Stamina 12–50.

Sepala fl. ♂ valvata. Pinnæ apice lato præmorsæ.

IRIARTEA, *R.* et *P.*

Spathæ 2. Stamina 6.

Spadicis scopæformis rhachis brevissima, rami floriferi penduli. Sepala fl. ♂ valvata. Folia pinnis acutis, vagina petiolari fusiformi antice fissa.

ŒNOCARPUS, *Mart.*

Spadicis rhachis elongata, rami floriferi porrecti. Sepala fl. ♂ imbricata. Folia pinnis acutis, vagina petiolari cylindrica integra.

EUTERPE, *Mart.*

Carpella 3 (raro plura) in ovarium triloculare coalita, unico loculo sæpius fertili, sterilibus tamen cum fertili intra putamen unicum symmetricum triforaminatum receptis.

Aculeatæ. Sepala petalaque fl. ♀ valvata vel gamophylla. Endocarpium apice foraminatum.

Stamina fl. ♂ 6 (raro plura) toro basilari imposita. Andrœceum fl. ♀ 0.

Petala fl. ♂ acuta. Folia simplicia, pinnatisecta vel pinnata; pinnis alternis sæpissime aggregatis basi reduplicatis, nunquam in cirros abeuntibus; vaginis ore hinc in ligulam protensis.

BACTRIS, *Jacq.*

Petala fl. ♂ acuminata. Folia pinnata, pinnis oppositis e basi constricta spurie petiolatis, superioribus in cirros abeuntibus, vagina petiolari in ocream elongata .... DESMONCUS, *Mart.*

Stamina fl. ♂ 6 ex ima corolla orta. Andrœceum fl. ♀ cupulare corollæ adnatum. ASTROCARYUM, *Mey.*

Inermes. Sepala petalaque fl. ♀ convoluto-imbricata. Endocarpium basi foraminatum.
Stamina 6 inclusa .... Cocos, *L.*
Stamina 6 exserta .... Maximiliana, *Mart.*
Stamina 9–24 inclusa .... Attalea, *H.*, *B.*, *K.*

Spathellifloræ. Spadix pinnato-ramosus, spathellis (bracteis tubularibus cyathiformibusve) plurimis distiche imbricatis tunicatus, spatha universali nulla. Folia sæpius flabelliformia.

Lepidocaryinæ. Fructus squamulis retrorsis loricatus.
Flores polystichi.
Corolla ♂ tripetala............... Mauritia, *L. f.*
Corolla ♂ gamopetala............ Orophoma, *Spruce.*
Flores distichi .... Lepidocaryum, *Mart.*

§ 13. *Neither the Degree of Excentricity of the Fruit, nor the Position of the Embryo in the Seed, is to be relied on in the formation of large Natural Genera of Palms.*

As far as possible, I have religiously preserved the genera within the limits assigned to them by the excellent Martius, choosing rather to stabilitate the ancient landmarks than to set up new ones. It will be seen that I have placed little stress on the degree of adhesion of the carpels in the ovary, which varies in closely allied species of the same genus—or on the measure of excentricity of the ripened carpel (when solitary), which is liable to quite as much variation. In so very natural a genus as *Œnocarpus* we find some fruits with lateral, others with apical stigmas. Under the genus *Iriartea* I shall have to point out the phases of structure in the ovary, fruit, and embryo, in species otherwise closely related in habit, foliage, &c., which have seemed to some authors sufficient to justify the breaking-up of that small genus into five!*

The ovule (solitary, rarely twin) is uniformly subsessile at the inner angle of the base of each carpel, and in most of the ovaries I have been able to examine is more or less completely anatropous; but neither does the position of the micropyle seem a constant concomitant of other peculiarities of structure.

The embryo, in the exocarpic or excentric-fruited genera, occupies almost every possible position on the periphery of the seed, being apical, basal, or medial in species otherwise closely related, as is best seen in *Iriartea*. In *Phœnix* some species have the embryo almost basal, in others it is midway (in *P. farinifera*, Roxb., &c.). In *Thrinax*, a genus which has (by abortion) a solitary carpel, the ripe seed has the embryo in some species at the geometrical apex, in others at a short distance below it; and so of many other genera. But in the genera with symmetrical fruits the embryo is pretty constant to one position in all the species.

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* The experienced botanist will at once call to mind analogous structures in such an order as Rutaceæ, in the umbraculiform Cordiæ, and in other polycarpellary families and genera.

§ 14. *The Number of complete Spathes is of great importance in defining the Genera.*

A good generic character seems to be afforded by the number of complete spathes, whether one, two, or many; but it has not in all cases been correctly ascertained. Two spathes coexist in some genera, where the outer of the two may be overlooked, from its being frailer and deciduous at an earlier stage than the inner—or from its remaining concealed within the sheathing base of the petiole, as happens to some *Geonomæ*, *Bactrides*, *Astrocarya*, &c.; and sometimes both spathes fall away with the first expansion of the spadix, long before the flowers are fully formed, which may cause them to escape observation altogether, as in *Leopoldinia*.

§ 15. *On the Separation of the Sexes, its importance in the economy of the plant, and the slight value of generic and specific characters founded upon it.*

Contrary to the example of my predecessors, I have made scarcely any use of the sexual phases of the inflorescence in the characters of either species or genera; for I have found many so-called dioicous inflorescences to be often monoicous, and that all possible phases of a diclinous inflorescence may be exhibited by species of the same genus. To explain how this comes about, we must first remark that, with few aberrations, the ternary type prevails throughout the organization of Palms. Not only are the parts of the flower some multiple of three, but there is a tendency to a tristichous arrangement of the leaves, which is most obvious in the *Lepidocarya* and other slender-stemmed palms; the spadices, if more than one on a leaf-ring (or axil), are commonly three, six, or nine, the middle one of each triplet being a female, the two lateral ones male spadices; and the flowers, following the same law, stand normally three together, often half-immersed in an alveole of the rhachis, the middle flower being a female, and the flower on each side of it a male.

In many palms there is a tendency of the ♂ flowers to become abortive, or even obsolete, in the lower part of the branches of the spadix, leaving *the ♀ flowers solitary* in or on their receptacle; while in the upper part of the same branches it is the ♀ flowers that disappear, and *the ♂ flowers that remain standing thereon in pairs.* This is the usual structure in the Cocoinæ, e. gr. in *Bactris*, *Attalea*, &c.; and in the imbricate-petaled Arecinæ, such as *Euterpe*, *Œnocarpus*, &c.

In other palms all the triplets of flowers, by the abortion of one sex or the other, will become unisexual on the entire spadix, causing some spadices to be solely male, with twin flowers, others female, with solitary flowers. This occurs most frequently in *Geonoma* and its allied genera *Leopoldinia*, *Nunnezharia*, &c., where the female flowers may be actually present on the male spadix, but remain effete between the pair of perfect females; and on the female spadix the male flowers, one on each side of the perfect female flower, never emerge from the alveole, but wither away unopened; or the flowers of the missing sex may be really obsolete. This gives rise to a very curious phenomenon which I would call

"*Alternation of Function.*"

I first ascertained its existence when at San Carlos del Rio Negro, near the debouchure of the Casiquiari, in this way. In May, 1852, I found a small plot of ground in the forest covered with plants of a delicate palm, a species of *Geonoma*, growing about ten feet high. The plants were all females, and bore young fruits. On revisiting the spot in the same month of the following year, I saw, to my astonishment, the very same plants all bearing male flowers alone! But the mystery disappeared when, on examination, I made out that male and female spadices must have alternated all the way up the stem. Afterwards I found that the same, or a similar alternation of function existed in many other palms, and that plants exercising (*pro tem.*) the male function stood rarely far apart from others exercising the female function. The following are the types of alternation that have fallen under my notice:—

♀ ~ ♂ in *Geonoma discolor* and other species.
♀ ~ ♀ ♂ in *G. paniculigera*, *chelidonura*, &c.
♂ ~ ♀ ♂ in *Maximiliana regia* and some other palms.

It is quite possible that extended observation might disclose the existence of all these modes of alternation in one and the same species; and I suppose they must all be regarded as *inter-*

mediate steps towards that complete dioicity which many species of palms have already attained.

It is easy to conceive how this change of function may operate as a kind of repose to the plant, whose energies will be less severely taxed when every alternate year (or season) it is relieved from the burden of maturing the fruit.

In species that have (apparently) become permanently dioicous, it is curious to note how the female flowers still stand singly, the male flowers in pairs, on their respective spadices and stems, the missing flowers of the opposite sex being sometimes indicated by scars or by empty bracteoles. In *Lepidocaryum* the flowers are distichous on the ramuli of the spadices, solitary in their receptacles on the female plant, twin on the male.

From all this it is obvious that the specific characters that have been drawn from the flowers standing by ones, twos, or threes, in or on their receptacles, are absolutely null; for they merely indicate sexual conditions, not specific differences.

§ 16. *The Flowers of Palms were probably at first Bisexual.*

That all palms (or, we might almost say, all plants) had in the remote past bisexual flowers, and have ever been tending towards a complete separation of the sexes, is highly probable; for *the multiplication of individuals leads to the division of labour, in the processes of plant-life, as well as in those of men, bees, ants, and other animals dwelling in communities.*

That the flowers of palms were originally all bisexual and self-fertilized, seems proved also by the existence of peculiarities of organization calculated to facilitate the process, and (though now become useless) still preserved, wholly or in part. The structure of the male flowers of *Geonoma* is a case in point. The pistils in these flowers (when present at all) are short and included; and such I suppose to have been their primitive state. The stamens, united below into a tube, have the free portion of the filament folded in at the apex, so as to bring the anthers into contact with the stigmas; and as the anthers burst by the effort the filament makes to unfold itself, some of the pollen must necessarily remain adhering to the stigmas. But the style having grown beyond the stamen-tube in some flowers, the stigmas became exposed and accessible to insects, by whose agency they would be more thoroughly fertilized by the pollen of other flowers. The offspring of the long-styled flowers, being more vigorous, would at length supplant the original form; so that we now find in *Geonoma* an effete ovary in the male flowers, a castrated stamen-tube in the female flowers—neither of the two of any actual use, but remnants of a structure which combined active organs of both sexes in the same flower.

Some Eastern palms, especially among the Spathellifloræ, are said to have at this day truly hermaphrodite flowers. Among American palms one finds in some species an occasional bisexual flower with all the organs perfect; but it is a case of extreme rarity. Even in *Mauritia*, where stamens are certainly present in the fertile flower, they have always seemed to me emasculated.

Note 1. In the foregoing Introduction, and in the descriptions which follow, it will be remarked that I speak always of the "leaves" of palms; for "fronds" they certainly are not, in the proper sense of that term, as applied to Ferns, to some Hepaticæ, &c.

In describing the mode of division of the leaves I have distinguished (with Martius) "pinnately cut" from "pinnate," as follows:—

Pinnatisecta, when a leaf is pinnately cloven down to the very rhachis in few divisions, usually only three on a side, which are almost or quite as broad at the base as at midway, and are inserted on a line parallel to the axis of the leaf (*verticalia*),

Pinnata, when there are numerous distinct leaflets which are narrowed at the base from being folded back on their own midrib (*reduplicata*), and are obliquely inserted on the rhachis (*semiverticalia*).

Note 2. For the species already described I have invariably adopted the most ancient name, and assigned it to its true author. The right of the author who has first named a species, and either intelligibly described it or published intelligible specimens of it, to have his name cited along with its name seems so indefeasible, that no number of botanical congresses, nor the practice of any individual botanist, however eminent, can do away with it. So far as my own names are concerned, I feel tolerably indifferent about their fate—the ownership of a mere name is a possession of so very little value; but when I have seen (in a late volume of the 'Prodromus') a writer not only ignoring that I had ever baptized any of the plants I had risked my life to gather, and coolly appropriating my names as his own, but also (in other cases) *calling my foundlings by ugly names, and giving them bad characters*, I confess to have felt a little of that indignation which a parent might legitimately give way to when told that his cherished offspring had been similarly ill-treated.

Note 3. The dimensions are given in French feet and inches, except where otherwise specified; and the miles spoken of are geographical.

GEONOMA, *Willd.*

The humble but graceful palms composing this genus often grow beneath the shade of the Mauritias, Attaleas, and other lofty palms, and bear about the same relation to them as the Hazels of our European woods do to the giant Oaks and other cupuliferous trees about whose base they love to cluster; but they grow also along with trees of all orders, and are not entirely absent from any class of forest, although perhaps less frequent in deeply inundated woods; and in open plains they are never found.

Many of the species afford excellent thatch, especially those of the group "Tectoriæ," which have long simple forked leaves, whereof the type is *G. baculifera*, a species abounding in damp submaritime forests of Amazonia and Guayana. These leaves, known as "Ubím" to the dwellers on the Amazon, "Dimíti" on the Casiquiari and Rio Negro, "Swallow-tail" to the English colonists in Honduras, and by many other local appellations, are usually fastened (to the number of eight or ten) on a lath, so as to widely overlap each other, and thus form a sort of long shingle. When exposed to atmospheric influences, they bleach almost white, but do not shrivel or curl in the least; so that a roof thatched with Ubím looks very neat, keeps out the rain perfectly, and lasts a long time. The species of Geonoma with divided leaves are known as "Ubim-rana," or False Ubím, and are rarely used as thatch, although they occasionally serve for packing salt fish and other products of the rivers and forests.

Walking-canes are often made of the stems, but they have the defect of being rarely perfectly straight. I have never seen the fruit of any species eaten, the mesocarp being thin and gritty, and the kernel hard and tasteless; but a species with edible fruit has been found by Wendland in Central America.

All that I can at present say of the geographical distribution of the *Geonomæ* is that they abound in the forests of the plain all the way from the northern to the southern tropic. In the Peruvian and Equatorial Andes they exist chiefly about the base of the mountains, perhaps not climbing higher than 4000 feet; but in the highlands of New Granada and Mexico there are species which ascend to a much greater elevation.

Stems.—The stems arise from a subterraneous globose rhizome that sends out stout horizontal roots, and usually reach a height of from 6 to 10 feet, very rarely overpassing 15 feet, their thickness being that of an ordinary walking-cane, or sometimes no greater than that of a swan's quill; and their smooth polished straw-coloured cuticle is marked with closely set rings (from $\frac{1}{2}$ an inch to 4 inches apart). A few species are stemless: and their number is perhaps fewer than is supposed; for I have never gathered any species which does not in its adult state rise above the ground with a distinct caudex. The stems vary in leafiness even in the same species. Characters drawn from the stems being either leafy throughout or else only at the apex, and from the position of the spadices, viz. arising from among the leaves or else below the leaves, are utterly fallacious; for they indicate in most cases merely the age of the individual, and not any specific difference. Young plants grow more rapidly, and the lowest leaf does not fall away until a good many succeeding ones have been developed; but as the plants grow higher they add on rings and leaves more and more slowly, and the older they are the fewer leaves do they bear at one time, the contemporaneous leaves in adult plants forming an apical crown exactly as in the larger palms. Neither on the stems nor any other part of the plant do there exist prickles or bristles of any kind; and even the pubescence of the young leaves and spadices very rarely persists until maturity.

Leaves.—The leaves, in some species less than a foot long, in others reach 6 feet or more. They are of thinnish but firm texture, and of a pleasant full green colour, which is mostly preserved in the dried specimens. The petiole of the largest leaves rarely exceeds from 1 to 2 feet; its sheathing base, a few inches long, is strongly but obtusely keeled at the back, but in front is tender and fibroso-membranous, soon breaking away after the evolution of the leaf. The lamina varies through all phases of division (except that the pinnæ are never cut at the slender acuminate points), being either entire or pinnatisect with 3–5 (rarely more) ligulate or rhomboidal pinnæ on each side, or pinnate with from ten to forty pairs of pinnæ. Where the leaves vary from entire to pinnatisect in the same species, the pinnæ or laciniæ are mostly of very unequal breadth and scarcely ever opposite; whereas in the species with normally pinnatisect leaves that never become simple, the pinnæ are usually opposite and subequal—although even in this case one or more of the pairs of pinnæ may be broken up into two pairs, whereof the lower pair is narrow and grassy, the number of veins in the whole leaf remaining unchanged. It is, in fact, on the number of the veins, rather than on that of the laciniæ or pinnæ, and on the angle they form with the costa or rhachis, that reliance is to be placed in discriminating the species, although further observation is needed to determine between what limits these characters vary. The number of primary veins is also that of vernation-folds. The secondary veins, along which is the reentering angle of each fold, are often indistinct on the upperside of the leaf; but on the underside they are more prominent than the primary, and are there clad with a deciduous tomentum, mostly ferruginous and scaly, but sometimes white and felty, being the only part of the leaf on which pubescence of any kind exists, except the petiole, which is, when young, more or less clad with the same kind of tomentum, and only becomes bald with age.

Spadices.—The plants begin to flower when a few rings high; and thereafter every ring or axil in some species bears a spadix in its turn; but in other species two or more rings intervene between the successive spadices; and a unisexual spadix often alternates with one bearing flowers of both sexes. In the stemless, or apparently stemless, species both leaves and spadices are, or seem to be, radical. The spadices vary in length from 2 or 3 inches to as many feet, and are usually suberect in flower, pendulous in fruit. They are simple, on long stalks, in a few species of peculiar aspect; but in most of the species they are branched. The ramification is never pinnate; usually it is irregularly paniculate, with a zigzag axis; and sometimes the crowded simple parallel branches render the panicle scopæform, although far less so than in the *Œnocarpi*. No good or constant character can be drawn from the branches being simple or again branched, although in a few species the branching is tolerably true to one mode or the other. The whole of the spadix is, when young, clad more or less densely with very short, squarrose, and often crispate hairs, but becomes denuded usually about the time of flowering, leaving the cuticle rugose or shagreened. The branches are floriferous from a little above the base, nearly or quite to the apex, the flowers being contained in rather closely set deep alveoles, which are oblong or ovate in outline, and have more or less of a rim widening on the lower side into a sort of lip, whose form affords one of the best specific characters. The alveoles are normally uniflorous, the middle flower being ♀, the two lateral (and more precocious) flowers ♂; but sometimes all the alveoles on a spadix contain but one flower each, and that one is ♀, the lateral ♂ flowers being obsolete; and on other spadices only the two ♂ flowers of each alveole reach maturity, the included ♀ flower remaining small and effete within the alveole. Spadices of these two types often alternate on the same stem.

The various modes in which the alveoles are arranged on the spadix afford characters for distinguishing the species. In many *Geonomæ* they are set round the rhachis in 5, 6, or 8 longitudinal rows; but it is scarcely correct to say, as has been said of most species *, that the *flowers* are "tri- plurifariam imbricati;" for (1) the alveoles and not the flowers are meant, and (2) they rarely stand so closely as to actually imbricate each other, at least in species hitherto described, although in my two new species, *densiflora* and *personata*, and in Wendland's *congesta*, they are in reality widely imbricated. These isostichous alveoles recall the similarly disposed leaves of many *Meteoria* among mosses, and of some *Lycopodia*.

Spathes.—Each spadix is at first included in two spathes, and emerges from them by bursting through their interior face, or, more rarely, through one edge. The spathes are elongato-fusiform, in most cases a good deal flattened, and always ancipitous, the edges being often dilated into wings; and in a few species the dorsal edge of the outer spadix is replaced, especially near the apex, by a pair of parallel keels or wings. They vary in length from barely 2 inches in *G. microspatha* to a foot and a half in *G. undata*, and are mostly of tender chaffy consistence, breaking up lengthwise and falling away sometimes before the flowers are well opened. In a few species the spathes are firmer and more enduring; and in nearly all cases perfect spathes (of spadices not yet evolved) may be found in the upper axils of the growing stem, although wanting to the flowering or fruiting spadices. They are, when young, densely clad with ferruginous tomentum, which, however, is easily rubbed off, and in age is usually quite obliterated.

Flowers.—Each alveole contains normally (as above said) three flowers, a female between two males. The flowers (usually about half-immersed) are trigonous and ovoid in the bud, and somewhat oblique or gibbous. Their outer angle is obtuse, and the lateral (inner) angles acute, which arises from the outer sepal being ecarinate, while the two lateral ones are sharply (or indeed alato-) carinate; so that of each ♂ flower the face abutting on the included ♀ flower is bounded by two sharp angles. The sepals are ovate or oblong, slightly imbricated, and chaffy in texture. The corolla is more coriaceous or cartilaginous, yellow or purple in colour, nearly or quite twice the length of the calyx; and the oval or lanceolate valvate petals are united to about midway, being free for a greater length in the ♂ than in the ♀ flower; and that is almost the sole difference. The relative length of the calyx and corolla in the male flower has been relied on as a character. I find it at best of little importance; and it can only be accurately determined in expanded flowers; for the corolla usually lengthens when about to open, whereas the calyx remains unchanged, so that their proportions are rarely manifest in the flower-bud.

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* *Vide* Kunth, Enumer. Plant. iii. pp. 229-234.

Both ♂ and ♀ flowers are subtended by two or more amorphous chaffy bracteoles, truncate, erose, or lobed, and so short as never to emerge from the alveole.

The ♂ flowers have six stamens, free from the corolla; but the filaments are united for half their length into a trigonous tube, and are, near the free apex, sharply folded down on themselves, the short inflexed portion bearing two completely separated linear anther-cells, at first deflexed and parallel, but finally erecting themselves, bursting lengthwise along their outer face, and then becoming divergent or circinate, in which state they protrude from the corolla. A small tripartite rudimentary pistil is sometimes concealed within the tube.

In the ♀ flowers the staminal tube is still present, but it is destitute of anthers, and either ends abruptly in 3–6 short triangular teeth, or is prolonged into 6 ligulate or finger-like processes (anantherous filaments) which protrude beyond the corolla in a stellate manner. This tube is in all the species equally broad from base to summit; but it is a common thing for small beetles to deposit an egg in the nascent ovary; and as the larva develops, the staminal tube swells below and becomes ovoid or lageniform. Usually it breaks away at the very base, and is carried up, along with the enclosed style, and finally thrown off by the growth of the ovary; but sometimes it breaks off just above the base, leaving the ovary seated in a small cup—although this is very rare, and is not constant even in the same species.

The ovary is normally tricarpellary, the carpels being united only at the very base and sending up a central style; but much oftener two of the carpels are obsolete; and then the style seems to spring from the inner base of the remaining carpel, which contains a solitary ovule. The style is trifid to about midway, the lobes being recurved and stigmatose in their upper half along the inner surface. In most species the stigmas barely emerge from the staminal tube, but in a few they are considerably exserted.

Fruits.—The fruit is a small dry berry, of a globose or oval form, rarely exceeding half an inch, and sometimes not more than a line in length; and it is encompassed at the base by the persistent floral envelopes. The thin cuticle is black when quite ripe, and in drying becomes in some species longitudinally and closely rugulose or interruptedly striate, but in other species tuberculate. This arises in the former case from the thin mesocarp containing a single layer of hard gritty lineari-fusiform fibres (?) alternating in close but not quite continuous rows. In the tuberculate fruits the fibres are globose or oblong, often knobby, and not unfrequently quite amorphous; and they seem scattered without order in the substance of the mesocarp. In some species (e. g. *G. tuberculata*) there is certainly present a thin hard dark-coloured endocarp; but I am unable to connect it with any other peculiarity of structure. The testa is thin and membranous, and is traversed nearly throughout its periphery by a circular band or rhaphe, which in some species is simple and in others is somewhat branched and reticulate. The albumen is corneous; and the ovule is lateral, usually a very little above the hilum.

Obs.—This very natural genus is sufficiently distinguished from all other genera of Palms by the long anther-cells being completely separate, without any connective; and in very few other genera are the spadices so deeply alveolate. The two sections into which I divide *Geonoma* are characterized by the andrœceum or staminal tube of the ♀ flower being truncate in *Eugeonoma*, with three or six short triangular teeth at the mouth; whereas in *Astrandrœceum* it is prolonged into six broad finger-like filaments. The latter group seems entirely confined to Amazonia and Guayana, and includes, besides the seven species gathered by myself, at least two of Martius's (*multiflora* and *Spixiana*), and one gathered by Schomburgk in Demerara.; but the character derived from the andrœceum is not supported by any other, and the foliage seems to pass through the same phases as in *Eugeonoma*. Even that character is rather weakened by the andrœceum in one of Wendland's species (*pumila*) being 6-*crenate*, with occasionally one of the crenatures a little elongated, indicating a transition from *Eugeonoma* to *Astrandræceum*; so that I do not consider the two sections at all equivalent to subgenera, but merely convenient analytical aids to the determination of the species.

Some of the subordinate groups are natural enough—those for instance which I have called *Holospadices*, *Densifloræ*, and *Verticilliforæ*; but most of the others can only be considered tentative, to be abolished or modified when more abundant materials are brought to their illustration.

I proceed to give a synopsis of all the species represented by intelligible specimens in the Kew Herbarium. It is matter of regret that so few of the species described by Martius exist there. The fine Geonomas discovered by Wendland in Central America are not always represented in the Kew Herbarium by specimens perfect enough to enable one to classify them with certainty; and some of my own specimens are by no means so complete as might be desired.

§ 1. *Eugeonoma.*

Tubus stamineus florum ♀ ore breviter 6- vel 3-dentatus, raro edentulus.

* *Spathæ angustæ,* 6–18-*pollicares, ancipites, sæpius compressæ.*

† Holospadices, *spadicibus omnino simplicibus*; *pedunculo elato, etiam florifero spathas plerumque superante.*

1. G. ELEGANS, *Mart.*: foliis pinnatisectis, laciniis 3–4-jugis rhomboideis longe acuminatis, alternis sæpe angustioribus gramineis, venis utrinque 19–23 acutiusculis; spadicibus pedalibus, alveolis 5–6-stichis labio inferiore subintegro; spatha interiore dimidium pedunculum vix superante; floribus demum alte emersis, fl. ♂ corolla calyce vix longiore, fl. ♀ tubo stamineo ore dentibus 6 triangularibus instructo.—*Hab.* Brasilia (*Gardn.* 5645; *Booz in hb. Hook.*).—Certe caulescens nec acaulis erit.

2. G. OBOVATA, *Wendl.*: priori affinis, foliis tamen vel simplicibus vel pinnatisectis ambitu obvato-cuneatis bifurcis; spadicum alveolis 8-stichis labio inferiore bifido.—*Hab.* Americæ Centralis Costa Rica (*Wendl.*).

3. G. CUNEATA, *Wendl.*: foliis plerumque simplicibus basi longe cuneatis, venis peracutis; spadicibus adspectu Aroideo, crassis, 16 pollices longis, alveolis confertis in series 8–10 subtortas dispositis, labio inferiore late obcordato; spathis linearibus compressis, fere *G. baculiferæ*, interiore pedunculum subsuperante.—*Hab.* Amer. Centr. Costa Rica (*Wendl.*).

4. G. GRACILIS, *Wendl.*: foliis e pinnis 3-jugis dissitis ligulatis gramineis falcato-acuminatis, venis utrinque 15; spadicibus pedalibus (pedunculo 8-pollicari incluso), tenuibus; spathis teneris pedunculo duplo brevioribus, alveolis parvis sub-5-stichis labio inferiore bifido.—*Hab.* Amer. Centr. Costa Rica (*Wendl.*).—Facies graminis generis *Parianæ* potius quam Palmæ.

5. G. PROCUMBENS, *Wendl.*: foliis e pinnis 6-jugis 8–12-pollicaribus ligulato-gramineis falcato-acuminatis, venis utrinque sub 20; spadicibus crassis Aroideis fere bipedalibus, alveolis 8- vel etiam 10-stichis labio inferiore ovato emarginato adscendente semiclausis; spathis tubularibus ancipitibus sed vix compressis, exteriore 4-pollicari, interiore duplo et ultra longiore.—*Hab.* Amer. Centr. Costa Rica (*Wendl.*).

[" GEONOMA ? PULCHRA " (*Wendl. in hb. Kew.*), if I may judge from the aged and incomplete specimen, is surely not of this genus; for although the pinnatisect leaves, with four pairs of long lanceolato-ligulate caudato-acuminate leaflets, are not unlike those of some Geonomas, the spadices are more like those of an Aroid or Cyclanth, having *contiguous* 8-ranked open alveoles of a long-hexagonal shape, without either rim or lip, containing the scars (for they are empty) of one ♀ and apparently several ♂ flowers. Wendland's specimen is from Costa Rica*.]

†† Tectoriæ, *foliis plerumque majusculis bifurcis basi longe cuneatis acutiveniis simplicibus v. pinnatisectis (laciniis paucis inæquilatis), rarissime pinnatis; spathis tempore florum pedunculum æquantibus v. subsuperantibus; spadicibus ramosis.*

a. Tectoriæ leptospathæ, *spathis teneris cito caducis.*

6. G. BACULIFERA, *Poit.*: foliis 3–4-pedalibus elongate cuneatis integris v. pinnatisectis pluriveniis (venis utrinque sub 40 angulo costali circiter 20°–25°); spathis lineari-lanceolatis compressis semipedalibus; spadicibus pedalibus, ramis 5–6 simplicibus, alveolis 6–8-stichis parvis confertiusculis labio inferiore integro; corolla florum ♂ calycem paulo excedente, tubo stamineo fl. ♀ trigono-cylindraceo ore brevissime 6-dentato; baccis ovalibus 4-linearibus grosse tuberculatis.—*Hab.* per Amazoniam submaritimam et Guayanam, frequens.

7. G. MACROSPATHA, sp. n.: foliis fere prioris venis utrinque 45; spathis linearibus, longissimis 15-pollicaribus; spadicibus fere bipedalibus, alveolis 8-stichis labio inferiore integro.—*Hab.* ad fl. Casiquiari.

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* To "Holospadices" belong also the following species described by Martius: *G. pycnostachys, stricta, acaulis, macrostachys* and *Poiteauana* (all of Martius).

8. G. MARTIANA, *Wendl.*: *G. baculiferæ* affinis, foliis tamen petiolisque præcipue brevioribus; spadicis ramis validioribus, alveolis parvis 6-stichis labio inferiore integro recurvo, tubo stamineo floris ♀ *G. baculiferæ.—Hab.* in America Centrali.

9. G. PORTEANA, *Wendl.*: foliis parvis vix bipedalibus simplicibus, lamina perangusta 2½ pollices lata basi brevicuneata, alis elongate rhomboideis, venis utrinque solum 18; spathis iis *G. baculiferæ* simillimis; ramis spadicis 3, fere 6-pollicaribus; floribus majusculis dissitiusculis, sepalis petalisque perangustis, tubo stamineo *G. baculiferæ.—Hab.* in regione fl. Amazonum loco ignoto.

10. G. EDULIS, *Wendl.*: hujus loci videretur, licet specimen Kewense folia non suppeditat, *G. baculiferæ* affinis erit ex alveolis parvis labio inferiore patulo integro et baccis ovalibus obovatisve subacutis subtrilineăribus; differt ramis spadicis longissimis 9–12 pollices longis.—*Hab.* Amer. Centr. Costa Rica.

11. G. MEMBRANACEA, *Wendl.*: foliis tenuissimis (rhachi tamen valida subtus acutissime carinata) pinnatisectis, pinnis 6–7-jugis 6–9 pollices longis ligulatis falcato-acuminatis, terminalibus prælatis rhomboideis, venis plurimis; spadicibus tenuibus pallidis 14-pollicaribus, ramis 5 tenuissimis flexuosis 5-6-pollicaribus, alveolis subdissitis; floribus parvis (in specimine nondum evolutis).—*Hab.* Guatemala (*Wendl.*).

12. G. HOFFMANNIANA, *Wendl.*: foliis pinnatisectis, laciniis gramineis, duabus apicalibus solis latioribus rhomboideis, omnibus caudiformi-acuminatis, venis plurimis angulo 25° subrectis; spadicibus pedalibus et longioribus, ramis 6 sat validis cinereis, alveolis parvis haud confertis, tubo stamineo *G. baculiferæ.—Hab.* Amer. Centr. Costa Rica (*Wendl.*).

13. G. LINDENIANA, *Wendl.*: foliis 3-pedalibus pinnatisectis, pinnis sub-6-jugis ligulato-rhomboideis, inferioribus gramineis, supremis latioribus, venis utrinque sub 27; spadicibus pedalibus ramos 10 validos 4–6-pollicares simplices v. infimos bifidos edentibus, alveolis subconfertis labio inferiore adscendente late ovato integro; floribus majusculis, tubo stamineo fl. ♀ ore brevissime 6-dentato.—*Hab.* Nova-Granata (*Funk*).

14. G. APPUNIANA, sp. n.: foliis magnis simplicibus (?) venis peracutis (angulo 15°–18°); spathis . . . .; spadicibus pedalibus et longioribus bis divisis, ramis validiusculis, alveolis dissitiusculis labio inferiore bifido; floribus magnis alte emersis, tubo stamineo fl. ♀ *G. baculiferæ.—Hab.* Guayana Britannica (*Appun., no.* 1411 *in hb. Kewensi*). —Ad *G. Lindenianam* et verisimiliter ad *G. undatam* accedit; ab hac venis multo acutioribus, ramis spadicis minus incrassatis, alveolis haud confertis &c. abunde differt.

To this section belong two palms preserved in the Kew herbarium under the name of "*G. simplicifrons*, Willd." They do not answer to their name, for the leaves are pinnatisect—nor to the character assigned by Martius (Palm. 14, t. 8), especially as to the leaves being attenuated at the base, whereas they are broadly cuneate. Neither do the two exactly agree with each other, as will be seen from the following brief descriptions:—

15. G. ——?: foliis parvulis, pinnis bijugis late rhomboideis falcato-acuminatis, venis utrinque 28, 7–8 pollices longis, angulo costali 45°; spadicibus 9–12-pollicaribus tenuiusculis ramos 3–5 simplices adscendentes purpureo-badios proferentibus, alveolis 5-stichis (nonnunquam obscure ternatim verticillatis) parvis labio inferiore integro raro demum rupto nec rite bifido; spathis *G. baculiferæ* 5–6-pollicaribus pedunculo subbrevioribus; floribus ♀ anguste obovoideis, tubo stamineo ore truncato obsolete 6-dentato.—*Hab.* Venezuela (*E. Otto*).

15*. G. ——?: a priore differt (an specifice?) habitu firmiore, pinnis 3-jugis oppositis 9-pollicaribus fere rectis, venis utrinque 19 angulo costali 40°; spadicibus 15-pollicaribus ramos 10 simplices subparallelos validiores proferentibus; fl. ♀ tubo stam. ore 6-crenato.—*Hab.* Nova Granata "woods at Pacho, near Bogotá" (*Purdie*).

b. Tectoriæ pachyspathæ, *spathis maximis robustis.*

16. G. UNDATA, *Klotsch*: foliis pinnatisectis, pinnis 4–5-jugis pedalibus et ultra, inferioribus ligulatis, supremis late rhomboideis, sensim acuminatis subfalcatis, venis plurimis angulo costali 33°; spadicibus (ut videtur) maximis 3–4-pedalibus bis divisis ramulis validis 6-pollicaribus, alveolis subconfertis labio inferiore bifido patulo demum recurvo laceroque; spathis maximis, interiore fere sesquipedali fusiformi (arte explanata elongato- et subspathulato-lanceolata) coriacea sed demum fibroso-dissoluta, exteriore fere dimidio breviore (explanata longe ovato-lanceolata) fere lignea dorso bi- trisulca furfuraceo-tomentella demum calvescente; floribus magnis trigono-pyriformibus pachychlamydeis, ♂ calyce corolla vix breviore, ♀ tubo stam. crassissimo ore truncato obsolete 6-dentato; baccis magnit. fructus Pruni spinosæ minoris ovalibus oblique apiculatis, siccando lineis elevatis rugulosis.—*Hab.* in Andibus Meridensibus, ubi ad Coloniam Tovar ista palma spectabilis abundare videtur (*Linden, Moritz et Booth in hb. Kew.*).

Ad *Geonomas* tectorias, et probabiliter ad pedem *G. Appunianæ*, valde dubitans (quum spathas nondum vidi) speciem sequentem adscribo:—

17. G. DENSA, *Wendl.*: foliis pinnatis, pinnis 21-jugis 9–12-pollicaribus lineari-lanceolatis fere a basi ad apicem usque sensim angustatis uni- triveniis plicatisque; spadicibus compositis (ramo unico mihi

viso 8-pollicari ramulos 5 validos proferente), alveolis dissitiusculis labio inferiore bifido; floribus magnis alte emersis fere squarrosis, tubo stamineo fl. ♀ truncato brevi-6-dentato.—*Hab.* Nova Granata (*Funk*).

G. magnifica, Linden, Eugeonomæ species videretur, sed e folio solo viso nec dicere ausim.

** Microspathæ, *spathis parvis 2–4-pollicaribus pedunculo sæpius multo brevioribus firmiusculis.* Folia pinnatisecta, raro pinnata, angulo costali venarum lato (40°–50°). Spadices simpliciter ramosi vel sæpius compositi, ramis tenuibus, alveolis parvis.

† Microspathæ verticillifloræ, *alveolis 2–4-natim verticillatis.*

18. G. SCHOTTIANA, *Mart.*: foliis pinnatis, pinnis linearibus apice attenuatis vix falcatis 3-plicatis; spadicibus bipedalibus, ramis prælongis 9-pollicaribus tenuibus flexuosis, inferioribus solis bifidis, alveolis oppositis decussatis labio inferiore bifido; baccis ovalibus 4 lineas longis iis *G. baculiferæ* simillimis.—*Hab.* Brasilia (*Gardn.* 705 et 2969 *in hb. Hook.*).—Alveolis decussatis *quasi-tetrastichis* facillime recognoscenda.

19. G. PANICULIGERA, *Mart.*: foliis $3\frac{1}{2}$-pedalibus pinnatisectis, pinnis 3-jugis rhomboideo-acinaciformibus acumine tenui, vel 5-jugis alternis angustis gramineis, basalibus fere sesquipedalibus, apicalibus subdimidio brevioribus, venis utrinque 35 angulo costali 40°; spathis $2\frac{1}{2}$-pollicaribus; spadicibus sesquipedalibus purpurascentibus bis divisis paniculatis, ramulis tenuibus 9-pollicaribus puberulis villosulisve, alveolis 3–4-natim verticillatis; baccis 2–3-linearibus globosis leviter tuberculosis.—*Hab.* ad fl. Negro et (teste Martio) ad fl. Japurá.

20. G. FLACCIDA, *Wendl.*: foliis pinnatisectis, pinnis sub 4-jugis 15-pollicaribus, alternis rhomboideis acumine subfalcato, alternis gramineis, venis utrinque 24 angulo 35° rectiusculis; spadicibus 1–$1\frac{1}{2}$-pedalibus paniculatis, ramis tenuibus semipedalibus, alveolis ternatim verticillatis labio inferiore brevi sæpius integro; fl. ♀ tubo stamineo ore dentibus 6 triangularibus instructo.—*Hab.* Amer. Centralis Costa Rica et Guatemala.—A *G. paniculigera* ægre distinguenda.

21. G. MICROSPATHA, sp. n.: foliis vix bipedalibus, pinnis 3-jugis pedalibus subæquilatis, venis utrinque 26–29 angulo costali 40°–50°; spathis bipollicaribus pedunculo triplo brevioribus; spadicibus vix pedalibus purpurascentibus ramos 7–11, $4\frac{1}{2}$-pollicares, simplices v. infimos bifidos proferentibus; baccis globosis ut in *G. paniculigera.*—*Hab.* ad fl. Negro.—*G. laxifloræ* (Mart. Palm. 12, t. 11) ulterius comparanda.

22. G. FENDLERIANA, sp. n.: a prioribus certe distare videtur pinnis sæpius bijugis vix semipedalibus, ramis spadicis solum 3 v. 4 cinereis nec purpurascentibus, et præcipue baccis obovato-globosis subacutis

lineis elevatis longitudinaliter rugosis nec tuberculosis.—*Hab.* Venezuela (*Fendl.* no. 2467).—? An *Gynestum deversum*, Poit. in Mém. du Mus. ix. 390, t. 3.

†† Microspathæ sparsifloræ, *alveolis sparsis 5–6-stichis.*

23. G. Saga, *Griesb.*: foliis pinnatisectis, pinnis 3-jugis subpedalibus rhomboideo-lanceolatis falcato-acuminatis (vel plurijugis, inferioribus gramineis), venis utrinque 28 angulo costali 45°–50°; spadicibus 1–2-pedalibus bis ramosis paniculatis, ramis tenuibus 4–5-pollicaribus pube densiore subpersistente villosulis, alveolis parvis labio inferiore integro truncato; fl. ♀ corolla usque ad medium fissa, tubo stamineo ore obsolete dentato stylum æquante; baccis ovali-globosis subacutis 2–3 lineas longis secus longitudinem rugulosis.—*Hab.* in insulis Antillanis (Dominica, *Imray*; Trinidad, *Purdie*).—Nescio quomodo ab hac differat *G. oxycarpa*, Karst., quum spadicem solum floriferum (in Trinidad à Crüger lectum) vidi.

24. G. Mexicana, *Liebm.*: foliis pinnatisectis, pinnis 4-jugis 16-pollicaribus longe rhomboideo-lanceolatis falcato-acuminatis, alternis sæpe angustis gramineis, venis utrinque 38; spadicibus 15-pollicaribus bis ramosis, ramulis 2–3-pollicaribus tenuiusculis pube subpersistente sparsis, alveolis parvis 5-stichis labio inferiore truncato integro; floribus ♀ angustis, corolla vix ultra $\frac{1}{3}$ fissa, tubo stam. ore 3-dentato.—*Hab.* Mexico (*Liebm. in hb. Kew.*).—*G. Sagæ* proxima, an revera diversa?

25. G. Purdieana, sp. n.: *G. Sagæ* similis, pinnis tamen duplo longioribus bipedalibus rhomboideis longe tenuiacuminatis pluriveniis; spadicibus bis terve divisis, ramulis tenuibus pube breviore decidua, alveolorum labio inferiore crassiore carnoso; floribus vix semiemersis tenuibus; baccis minutis sesquilineam longis ovato-globosis acutis.—*Hab.* Nova Granata ad Rio de la Hacha (*Purdie*, no. 259, *in hb. Hook.*)*.

26. G. versiformis, *Wendl.*: foliis . . . . ; spadicibus 10-pollicaribus patule ramosis, ramis infimis 3-fidis, cæteris (octo) simplicibus 4–6-pollicaribus validiusculis, alveolis parvis subconfertis 6-stichis labio inferiore adscendente bifido; fl. ♀ fere immersis, corolla calyce vix longiore, tubo stam. ore truncato obsolete 6-dentato. *Hab.* Amer. Centralis Costa Rica (*Wendl. in hb. Kew.* specim. spadicis sine foliis).

27. G. longevaginata, *Wendl.*: foliis (e specimine fragmentario) majusculis pinnatisectis, pinnis 7-jugis ligulatis apice falcatis inæquilatis, latioribus pluriveniis; spadicibus sesquipedalibus (pedunculo

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* I describe doubtfully this fine palm; for the specimens appear to comprise portions of two distinct species, the large woody spathe belonging probably to *G. undata*, so that even the spadices may not be from the same plant as the leaves.

brevissimo) subsimpliciter ramosis, ramis 2 infimis solis bifidis, omnibus ramis 8–9-pollicaribus validiusculis, alveolis subconfertis obscure 6-stichis parvis subtriangularibus labio inferiore adscendente bifido; floribus parvis turgide trigonis (omnibus quos vidi ♂).—*Hab.* Amer. Centralis Costa Rica.—An certe ad hanc sectionem pertinet?

28. G. PUMILA, *Wendl.*: foliis parvis, pinnis 2–3-jugis 4–6-pollicaribus rhomboideo-lanceolatis subovatisve acuminatis, venis utrinque 15; spadicibus 10-pollicaribus fuscis ramos sex 5-pollicares edentibus, alveolis parvis obscure 4–5-stichis labio inferiore bifido; fl. ♀ tubo stamineo ore oblique truncato 6-crenato.—*Hab.* Nova Granata (*Funk*).

29. G. MICROSPADIX, *Wendl.*: foliis pinnatisectis, pinnis 3-jugis oppositis rhomboideo-acinaciformibus apice tenui falcato, venis utrinque 27, 7–8 pollices longis basi recurvis secus apicem incurvis; spadicibus 8-pollicaribus bis divisis, ramis inferioribus ramulos 5 curvulos 2–2½ pollices longos proferentibus, alveolis parvis sub 5-stichis labio inferiore brevibifido; floribus parvis, ♀ tubo stamineo ore obsolete dentato; baccis ovali-globosis 2½ lineas longis.—*Hab.* Amer. Centralis Costa Rica.—Vix digna nomine "microspadix," si spadix in specimine Kewensi (ex ipso auctore) revera ad folium pertineat.

30. G. FERRUGINEA, *Wendl.*: priori affinis; foliis majoribus, laciniis caudato-acuminatis, venis utrinque 35; spadicum ramulis 3–4-pollicaribus, alveolis 5–6-stichis; floribus ♀ vix apice emersis, tubo stamineo ore brevissime 3-dentato demum supra basin circumscisse rupto.—*Hab.* cum priore (*Wendl.*).

31. G. PAUCIFLORA, *Mart.* (?): foliis pinnatis, pinnis 10-jugis 10–11 pollices longis lineari-lanceolatis falcato-acuminatis 2–3-veniis, angulo costali venarum 40°; spadicibus 7-pollicaribus, ramis sub 4 simplicibus, alveolis obscure 5-stichis labio inferiore emarginato; spathis vix 4-pollicaribus; baccis globosis pisum minus æquantibus.—*Hab.* Brasilia bor. ad fl. Negro (*Spruce*), etiam in provinciis Piauhy et Maranhão (*Martius*).—Cum descriptione *Martiana* vix rite convenit.

32. G. HEXASTICHA, sp. n.: foliis 3-pedalibus pinnatis, pinnis 27-jugis lineari-lancealatis falcato-acuminatis 4–5-plicato-venosis, mediis 14-pollicaribus, apicalibus 7-pollicaribus, pinnis venisque angulo 60° e rhachi extendentibus; spadicibus vix pedalibus scopæformibus ramos duodecim 4–6-pollicares puberulos simplices (infimis duobus solis 2–3-fidis) edentibus, alveolis subconfertis exacte 6-stichis labio inferiore profunde emarginato; baccis oblongo-ovoideis 3½ lineas longis.—*Hab.* Brasilia bor. ad fl. Negro.

33. G. DISCOLOR, sp. n.: foliis 3-pedalibus pinnatis, pinnis 16–22-jugis 13–15 pollices longis pollicem latis lineali-lanceolatis sensim acuminatis subtus albidis, venis cujusque pinnæ 4–5 validis angulo costali

45° ; spadicibus pedem et ultra longis bis terve ramosis, alveolis. . . . ; spathis parvis ovatis ancipitibus; fl. ♀ tubo stamineo. . . .—*Hab.* ad flumen Amazonum prope fl. Tapajoz ostia.—Haud absque dubio ad hanc sectionem relata, quum spadices speciminum deviaverunt, et notulas in planta viva valde incompletas solum feci.

§ 2. *Astrandræceum.*

Tubus stamineus florum ♀ apice in lobos 6 ligulatos vel digitiformes (filamenta ananthera) demum ultra corollam stellato-exsertos fissus*.

* *Folia simplicia bifurca.*

34. G. CHELIDONURA, sp. n.: foliorum petiolo (rhachi inclusa) 9-pollicari, furcis lineari-rhomboideis acuminatis 13 × $1\frac{3}{4}$-pollicaribus, venis utrinque solum 10–13 rectiusculis angulo costali 30°; spadicibus $4\frac{1}{2}$-pollicaribus simpliciter ramosis, ramis 3–7 tenuibus puberulis, alveolis sub-5-stichis labio inferiore majusculo bilobo; spathis $1\frac{1}{2}$–2-pollicaribus teneris; fl. ♀ tubo stamineo corollæ æquilongo lobis 6 ligulato-subulatis stellato-emersis; baccis ovato-ovalibus subacutis 4-5 lineas longis siccando obscure tuberculosis.—*Hab.* ad fluvios Casiquiari et Uaupés.

35. G. AMBIGUA, sp. n.: foliis bifurcis, furcis 13 × 2-pollicaribus rhomboideo-lanceolatis apice subfalcatis vix acuminatis, venis utrinque 9 angulo costali 30°; spadicibus 9-pollicaribus bis ramosis, ramulis crassiusculis, alveolis sub-5-stichis labio inferiore erecto bilobo; fl. ♀ tubo stamineo ore digitiformi-lobato (?)—*Hab.* Guayana Britan. (*Appun.* no. 566.).—Omnes quos examinavi flores jam semidestructi fuerunt; tubus stamineus tamen fl. ♀ ore digitifidus videbatur. Folium unicum imperfectum aderat.

36. G. SCHOMBURGKIANA, sp. n.: foliis bifurcis, lamina 11-pollicari, secus costam mensa, sed 16-pollicari ad furcarum apices usque, latitudine majore $4\frac{1}{4}$-pollicari, longe obovato-cuneata bifurca, venis utrinque 21 fere rectis angulo costali 20°; spadicibus subpedalibus bis ramosis, ramulis patulis 3–4-pollicaribus tenuiusculis, alveolis parvis subconfertis subdecussatis (unde tetrastichi evadunt), labio inferiore profunde obcordato; floribus parvis altius emersis, ♀ tubo stamineo ore digitiformi-6-fido; stylo ultra tubum longe exserto, stigmatibus recurvo-patulis; baccis ovalibus $2\frac{1}{2}$ lineas longis.—*Hab.* Guayana Brit. (*Schomburgk.* no. 705 *in herb. Bentham.*)—*G. chelido-*

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* *Calyptronoma*, Wendl. (=*Elæis occidentalis*, Sw.) cum *Geonoma* § *Astrandræceo* tubo stamineo fl. ♀ ore digitifido congruit; antheris tamen fl. ♂ erectis sagittatis, loculis connectivo subulato adnatis nec liberis, spadicibus sicco statu lævissimis, &c. bene genericeque differt.

nuræ subaffinis, et e foliis *G. Porteanæ*, sed maxime *G. Spixianæ* (Mart. Palm. 15. t. 15, 16), cui tamen sunt folia multo majora (4-pedalia).

** *Folia pinnatisecta, pinnis oppositis 3-jugis subæqualibus, v. interrupte 4–5-jugis.*

† Densifloræ, *alveolis 8-stichis in rhachides congestis revera imbricatis.*

37. G. DENSIFLORA, sp. n.: foliis bipedalibus, pinnis pedalibus rhomboideo-lanceolatis acumine tenui, venis utrinque 28–30 angulo costali 40°; spadicibus 8–11-pollicaribus simpliciter ramosis, ramis 3–7 validis 3½ pollices longis pube decisa validius rugulosis, alveolis densissimis 8-stichis labio inferiore profunde obcordato bifidove; fl. ♀ tubo stamineo ore digitato-lobato; baccis ovalibus semipollicaribus tuberculosis.—*Hab.* Brasilia bor. ad fl. Negro.

38. G. PERSONATA, sp. n.: foliis fere prioris; ramis spadicis 3–5 crassissimis, alveolis 8-stichis labio inferiore magno late ovato obtuso retusove fornicato; baccis paulo majoribus ovalibus ovoideisve.—*Hab.* cum priore.

39. G. CONGESTA, *Wendl.*: prioribus affinis videtur, folia tamen non habui, et e floribus in specimine jam semidestructis non certe ad eandem sectionem referenda. Constat specimen Kewense spadice 9-pollicari, ramis crassis 3–4-pollicaribus inferioribus bifidis, alveolis labio inferiore erecto profunde emarginato, floribus squarrosis vetustis genitalibus omnino orbatis.—*Hab.* Amer. Centralis Costa Rica (*Wendl.*).

40. G. ASPIDIIFOLIA, sp. n.: foliis parvis 15-pollicaribus, pinnis 3-jugis rhomboideo-acinaciformibus acumine filiformi, venis utrinque 20 bis flexis medio fere squarrosis; spadicibus parvis 3½-pollicaribus ramos tres simplices validiusculos fulvos edentibus, alveolis obscure 5-stichis labio inferiore brevissime emarginato; spathis fere bipollicaribus firmiusculis; fl. ♂ filamentis apice bicruribus, fl. ♀ tubo stamineo ore profunde 6-fido.—*Hab.* ad fl. Tarumá in flumen Negro defluentem.

41. G. TUBERCULATA, sp. n.: priori affinis, minor; foliis vix pedalibus, pinnis bijugis, venis utrinque 12 solum; spadicibus tamen majoribus 7-pollicaribus, ramis 5–6, alveolis labio inferiore emarginato v. breviter bifido; spathis 3-pollicaribus; floribus....; baccis globosis magn. pisi minoris siccando grosse tuberculosis. *Hab.* ad fl. Negro.

*** *Folia pinnata.*

42. G. PARAENSIS, sp. n.: foliis pinnatis; pinnis sub 11-jugis 14×1-pollicaribus elongato-lanceolatis acumine tenui planiusculis sub 5-veniis, angulo venarum 70°; spadicibus bis ramosis, ramulis 7-pollicaribus, alveolis dissitis obscure 5-stichis labio inferiore perangusto

semiannulari emarginato; fl. ♂ loculis antherarum prælongis, fl. ♀ tubo stamineo ore digitato-6-fido.—*Hab.* ad flum. Amazonum prope Pará.—*G. multifloræ* (Mart. Palm. 7, t. 4–6) affinis, cui tamen sunt alveoli laxiusculi nonnunquam tristichi. Probabiliter varietas erit.

43. G. NEGRENSIS, sp. n.: foliis 3-pedalibus pinnatis; pinnis 20-jugis 13½ pollices longis lineari-lanceolatis longe sensim acuminatis, venis cujusque pinnæ 4–7 validis, angulo costali 65°–70°; spadicibus semipedalibus simpliciter ramosis; ramis 5, 3½-pollicaribus, alveolis obscure 5-stichis confertiusculis labio inferiore patulo profunde bifido; fl. ♀ tubo stamineo apice digitato-6-fido.—*Hab.* ad fl. Negro.

Descriptiones specierum ab ipso auctore lectarum*.

6. G. BACULIFERA, *Poit. in Mém. du Mus.* ix. 389, t. 2.

Hab. Guiana Gallica (*Poiteau*; *Sagot*, no. 815 *in hb. Kew.*); in sylvis secus fl. Amazonum ostia et urbem Pará frequens, nomine "Ubím" Brasiliensibus cognita (*Spruce, hb. Palm.* 71).

Caudex tenuis arundinaceus 5–10-pedalis, raro vix ullus.

Folia fere 4-pedalia (stipite 10-pollicari incluso) elongate cuneata apice bifurca, simplicia vel rarius pinnatisecta; alis 6 pollices latis tenuicuspidatis; *venis* utrinque 42-nis, 14–15 pollices longis, angulum 25°–28° cum costa efformantibus, rectis superne leniter incurvantibus.

Spadicis simpliciter ramosi *pedunculus* tempore florum spathis omnino velatus, vix semipedalis, fructu maturato tamen fere duplo longior; *rami* sex, 5–6-pollicares, ecaudati. *Spathæ* 6 pollices longæ, semunciam latæ, lineari-lanceolatæ, compressæ; exterior anceps, acie dorsali secus apicem sæpius bialata; interior ultra exteriorem subprotrusa.

Flores solitarii vel 2–3-ni in eodem spadice, obscure 6–8-stichi; *alveoli* parvuli labio inferiore integro truncato vel brevissime triangulari. *Fl.* ♂ calyx corolla subbrevio; stamina vix ad medium usque coalita, filamentis apice brevissime bicruribus. *Fl.* ♀ *tubus stamineus* carnosus trigono-prismaticus ore brevissime 6-dentatus, florum abortivorum nonnunquam inordinate elongatus subclavatus. *Baccæ* ovales 4×3½-lineares, grosse tuberculosæ.

Var. 1. *Folia* pinnatisecta, laciniis bijugis, venis utrinque sub-40-nis 15 pollices longis angulo directionis 28°. *Flores* 6-stichi.—*Hab.* cum forma normali (*S. hb. Palm.* 71 A).

Var. 2. *Folia* pinnatisecta, laciniis 4-jugis, alternis latis loriformibus, alternis angustis gramineis, venis 20-pollicaribus angulo 23°–25°. *Spathæ* longitudinem 9½ pollicum attingunt. *Flores* obscure 8-stichi. —*Hab.* ad Pará cum forma normali (*S. hb. Palm.* 71 B).

Var. 3. *Folia* 38 pollices longa, simplicia vel semel bisve pinnatisecta,

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[*] The species are numbered as in the foregoing Conspectus.

venis acutioribus (angulo 17°–20°) rectis apice solo incurvis. *Spathæ* angustæ fere lineares, 7 pollices longæ, ancipiti-bialatæ. *Spadix* ramis 5 tenuibus 4–5-pollicaribus. Flores 6–8-stichi parvi (nondum aperti).—*Hab.* in sylvis fl. Uaupés (*S. hb. Palm.* 72).

7. G. MACROSPATHA, sp. n.

Hab. per totum fl. Casiquiari superiorem (supra fl. Siapa ostia), gregaria in sylvis primævis, "Dimíti" Indorum Barré dicta (*S. hb. Palm.* 42).

Caudex 8–12-pedalis robustus plerumque erectus.

Folia 4-pedalia et majora (stipite 10-pollicari incluso), simplicia, basi anguste cuneata, apice bifurca tenuicuspidata; *venis* utrinque 45-nis, 15 v. 16 pollices longis, angulum 20°–25° cum costa efformantibus, alternis subtus tomentellis mox glabratis.

Spadicis stipes spathas paulo excedens; *rami* 6, simplices, 8-pollicares, robusti, apice sterili breviter caudati. *Spathæ* longissimæ, exterior 15 × $\frac{3}{4}$-pollicaris, interior paulo brevior pro spadicis emissione ab apice ultra medium fissa; ambæ spathæ lineares ancipites forma fere Iridis foliorum, ferrugineo-tomentellæ, mox calvæ.

Flores subsparsi obscure 8-stichi solitarii binive; alveoli cordati labio inferiore apiculato vel brevissime triangulari. *Fl.* ♂ *calyx* corolla parum brevior, sepalis subimbricatis oblique ovatis concavis carinatis inter se inæquilatis. *Corolla* 3-partita, laciniis ovato-ovalibus valvatis apice subcucullatis. *Stamina* basi in columnam brevem coalita; *antheræ* loculis estipitatis.—*Fl.* ♀ *G. baculiferæ.*

19. G. PANICULIGERA, *Mart. Palm.* 11, t. 10.

Hab. Brasilia bor. in sylvis humidis ad fl. Negro cataractas (*S. hb. Palm.* 32); etiam ad fl. Japurá (*Martius*).

Caudex 12–15-pedalis, diametro $\frac{3}{4}$-pollicari, erectus vel inclinatus.

Folia plurima (15–20 vel etiam 30) contemporanea, $3\frac{1}{2}$-pedalia; *petiolus* 15-pollicaris, supra profunde canaliculatus, subtus carinato-convexus, ferrugineo-leprosus demum calvus; *lamina* 27-pollicaris (secus costam mensa) apice furcata, varie pinnatisecta, sæpius pinnis 3-jugis latiusculis rhomboideo-acinaciformibus attenuato-acuminatis, cum jugis duobus pinnarum angustiorum graminearum interpositis constans; *venæ* utrinque 35 rectiusculæ basi paulo apice magis curvatæ, angulo costali 40°, basales $17\frac{1}{2}$ pollices longæ, mediæ 14 pollices, apicales $9\frac{1}{2}$ pollices longæ.

Spadices infra frondes oriundi (spadice ♀ cum ♂ v. polygamo sæpe alternante), purpureo-badii, 12–20-pollicares (pedunculo 4-pollicari inferne compresso, bracteis 6 circiter semiannularibus stipato incluso), compositi, *ramis* inferioribus ramulos 3–5 proferentibus, omnibus ramulis subæquilongis 9-uncialibus tenuibus sparse puberulis fere ad apicem usque floriferis; *alveoli* 3–4-natim verticillati rarius sparsi. *Spathæ* parvæ $2\frac{1}{2}$-pollicares oblongo-obovatæ compressæ, apice ventricosæ ancipites, dense ferrugineo-tomentellæ, pro spadicis emissione antice rimosæ et posthac caducæ.

Flores ♂ : *sepala* subimbricata, inter se subinæqualia, oblonga obtusa carinata cucullata, dorso apicis puberula; *petala* subdimidio longiora, vix ad medium usque coalita, supra medium conspicue venosa, apice obtuso incrassato; *staminorum filamenta* ad medium usque in tubum trigonum interne 6-sulcatum concreta, apice in filamentula duo introflexa antherarum loculis subbreviora fissa; *ovarii rudimentum* stylos 3 breves gerens.

Flores ♀ masculis subbreviores; *calyx* maris; *petala* ultra medium coalita; *tubus stamineus* corolla subbrevior carnosus, ore breviter 6-dentatus, demum ovario crescendo basi secedens et cum stylo deciduus; *ovarium* monocarpellare (cæteris duobus carpellis obsoletis); *stylus* e basi interna oriundus supra medium trifidus, lobis recurvis dimidio superiore intus stigmatosis.

Baccæ globosæ diametro 2–3-lineares nigræ læviusculæ; *pericarpium* siccum crustaceum leniter tuberculosum; *testa* tenuissima per totam fere peripheriam rhaphis vasibus percursa; *albumen* corneum; *embryo* paulo supra hilum lateralis.

Obs.—I have little doubt that I am correct in referring this palm to Martius's *Geonoma paniculigera*, although he describes it "paniculis hirtulis," adding "variat spadicibus villo multo magis conspicuo hirtis;" while my specimens have no more than the short squarrose pubescence usual in the genus, which falls away as the fruit advances to maturity; and there is the same pubescence on Wendland's specimen of his *G. flaccida*, which is scarcely distinguishable as a species.

Young and luxuriant plants are sometimes leafy from the very base, but adult ones only towards the apex.

Not every leaf-axil puts forth a spadix. It is usual to see two flowering spadices at a time on a plant, with from one to three intervening flowerless rings; below these the spadix of the preceding year often persists, and still retains a few fruits. None of the spadices is fully developed until the leaf has fallen from whose axil it arises.

A spadix with all the flowers ♀ and the alveoles uniflorous usually alternates with another which has both ♀ and ♂ flowers in triflorous alveoles.

The staminal tube of the ♀ flowers secedes at the base as the ovary swells, and finally falls off, carrying the style or stigmas along with it; or more rarely it is circumscissile just above the base, which persists as a shallow membranous cupule to the fruit.

30. G. MICROSPATHA, sp. n.

Hab. in monte granitico secus fl. Negro cataractas, ubi alt. 1200 pedum gregarie et copiose viget (*S. hb. Palm.* 28).

Caudex 5–10-pedalis tenuis erectus subflexuosus.

Folia pauca contemporanea pinnatisecta; petiolus 6-pollicaris; lamina 15-pollicaris secus costam mensa; pinnæ 3-jugæ oppositæ, rhomboideo-acinaciformes acumine tenui; venæ primariæ utrinque 26–29, angulo costali 40°–50°.

Spadices inter folia oriundi 11-pollicares sæpe subpenduli paniculati; *pedunculus* teres flexuosus; *rami* polystichi 7–11, infimis plerumque bifidis, cæteris simplicibus tenuibus 4–4½-pollicaribus; *alveoli* parvi, labio inferiore prominulo truncato integro. *Spathæ* parvæ pedunculo triplo breviores, compressæ papyraceæ; *exterior* bipollicaris, dorso bialata, antice ala unica subapicali instructa; interior subminor dorso unicarinata.

Flores parvi: ♂ *sepala* eroso-fimbriata; *corolla* duplo longior ad medium usque 3-fida. *Fl.* ♀ masculis subconformes, corolla tamen breviore; *tubus stamineus trigonus* ore 6-dentatus -sinuatusve. *Baccæ* globosæ fere *G. paniculigeræ.*

Var. PACIMONENSIS (*Spruce, hb. Palm.* 41) cum typo convenit, spadice simpliciter ramoso excepto. *Folia* subminora venis utrinque 23 v. 24. *Baccæ* minores.—*Hab.* ad confluentiam fluviorum Pacimoni et Casiquiari.

31. G. PAUCIFLORA, *Mart. Palm.* 12, t. 12.

Hab. in sylvis fl. Negro prope urbem Manaos (*S. hb. Palm.* 16); etiam "in sylvis provinciarum Piauhiensis et Maranhiensis, locis udis" (*Mart. l. c.*).

Caudex 15-pedalis tenuis, diametro 3½-lineari, ligno duro, annulis confertis (sesquipollice sejunctis).

Folia plurima contemporanea 3-pedalia pinnata; *pinnæ* sub 10-jugæ 10–11 pollices longæ, lineas 5 latæ, spatio 10 linearum disjunctæ, lineari-lanceolatæ falcato-acuminatæ, basi reduplicatæ, 2–3-veniæ, venis angulo 40° e costa extendentibus.

Spadices 7-pollicares simpliciter ramosi; *rami* sub 4 tenues, 3–3½-pollicares; *alveoli* sparsi obscure 5-stichi; labio inferiore emarginato bifidove. *Spathæ* ancipites 3¾-pollicares lineari-lanceolatæ.

Flores ♀: e reliquiis semidestructis tubus stamineus ore truncatus obsolete 6-dentatus videretur. *Baccæ* globosæ pisum minorem æquantes.

32. G. HEXASTICHA, sp. n.

Hab. ad fl. Negro cataractas in sylvis recentioribus (*S. hb. Palm.* 29).

Caudex mihi haud visus.

Folia sub-3-pedalia pinnata; *pinnæ* 27-jugæ, basi subreduplicatæ, interspatiis angustiores, lineari-lanceolatæ falcato-acuminatæ, 4–5-plicato-venosæ, mediæ 14-pollicares, apicales 7-pollicares, angulo 60° e rhachi extendentes.

Spadices 11-pollicares, subcorymbose ramosi vel scopæformes; *pedunculus* 5-pollicaris compressus basi dilatato-amplexans; *rami* 11–12, 4–6-pollicares, tenues, puberuli, infimi bi- trifidi, cæteri simplices, apice sterili caudati; alveoli subconferti exacte hexastichi, 1–3-flori, labio inferiore brevi profunde emarginato, superiore semicirculari. Spathæ....

Flores ♂: *sepala* vix imbricata angustiuscula obliqua valde inæquilatera; *petala* fere duplo longiora, valvata, lanceolato-oblonga subobtusa, striata. *Fl.* ♀: *tubus stamineus* trigonus ore breviter 6-dentatus; *ovarium* solitarium ovale; *stylus* basalis, supra tubum stamineum in stigmata tria divisus. *Baccæ* oblongo-ovoideæ subgibbæ 3½ × 2-lineares.

33. G. DISCOLOR, sp. n.

Hab. in sylvis ad fluminum Tapajoz et Amazonum confluentiam (*Spruce, hb. Palm.* 36; 30 *ad Mus. Kewense*).

Caudex 6-pedalis crebre annulatus.

Folia 3-pedalia et longiora pinnata; *pinnæ* 16–22-jugæ, 13–15 pollices longæ, pollicem latæ, lineali-lanceolatæ sensim acuminatæ, basi reduplicatæ, medio subcontiguæ, supra pallide virides, subtus albescentes, venis 4 v. 5 validis angulo 45° tendentibus percursæ; *petiolus* validus supra profunde canaliculatus.

Spadices infra folia oriundi, plerumque ♀ et ♂ in eodem caule alternantes, patuli, pedales et longiores, bis terve compositi, ramis flavidis; *alveoli* ..... *Spathæ* parvæ ovatæ ancipites antice apertæ cymbiformiconcavæ, stuppa badia vestitæ demum calvæ.

Flores ♂: *sepala* cucullata; *petala* fere duplo longiora pluricostata; *staminum* filamenta basi in tubum coalita; antherarum loculi introflexi per anthesin patuli divergentes. *Fl.* ♀....

34. G. CHELIDONURA, sp. n.

Hab. in sylvis humidis vel etiam inundatis fl. Uaupés et Casiquiari (*S. hb. Palm.* 43 *et* 73).

Caudices 5–12-pedales, tenues, diametro 2–3-lineari, flexuosi, plures (ut videretur) ex eodem rhizomate orti.

Folia simplicia bifida; *petiolus* 6½-pollicaris, basi alte obtuse carinatus; *lamina* vix 3-pollicaris (secus costam mensa), furcis duabus constans lineari-rhomboideis acuminatis 13 × 1¾-pollicaribus; *venis* utrinque solum 11–13, angulum 22°–37° cum costa efformantibus, fere ad apicem usque rectis.

Spadices 4½-pollicares, simpliciter ramosi, adscendentes, alternis sæpe ♀, alternis ♀ ♂; *pedunculus* 2-pollicaris; *rami* 3–7, 2–2½ pollices longi tenues setuloso-puberuli, mutici vel caudati; *alveoli* sub-5-stichi, labio inferiore majusculo bilobo. *Spathæ* 1½–2-pollicares, cito dissolutæ.

Flores parvuli semiimmersi: ♂ *calyx* corolla fere dimidio brevior *petala* plus minus alte connata; *stamina* exserta; pistilli rudimentum carnosum. *Fl.* ♀ *tubus stamineus* corollæ æquilongus, processibus 6 ligulato-subulatis stellato-emersis terminatus; *stylus* corolla duplo longior stigmatibus recurvis. *Baccæ* ovato-ovales subacutæ, 4–5 lineas longæ, siccando obscure tuberculosæ.

Obs.—Specimina sub no. 73, ad fluvium Casiquiari lecta cum iis fluvii Uaupés (no. 44) satis conveniunt. Venæ tamen foliorum pauciores, sub 10, peracutæ, angulo costali sæpe 22° haud excedente. Spathæ et spadices longiores, hi fere 6-pollicares; ramis spadicis ♀ caudatis, spadicis ♀ ♂ muticis.

37. G. DENSIFLORA, sp. n.

Hab. in sylvis secus cataractas fluvii Negro, præcipue in montibus graniticis Sti. Gabrielis (*Spruce hb. Palm.* 30, 33.).

Caudex 6–8-pedalis erectus tenuis, diametro 4-lineari, annulis confertis spatio semipollicis sejunctis.

Folia 9 circiter contemporanea, pinnatisecta, 25 pollices longa (petiolo pedali incluso); *pinnæ* 3-jugæ rhomboideæ sublanceolatæ tenuiacuminatæ, infimis angustioribus; *venæ* primariæ utrinque 28, 11 pollices longæ, angulum 40° cum rhachi efformantes, venulis (inter quamque venam primariam et alternantem secundariam) suboctonis.

Spadices floriferi erecti, fructiferi penduli, 8½-pollicares, simpliciter ramosi; *pedunculus* tripollicaris compressus decidue puberulus; *rami* 3 validi 3½-pollicares mutici grosse tuberculosi; *alveoli* densissime imbricati, 8-stichi, labio inferiore profunde obcordato bifidove. *Spathæ* fere 3-pollicares ancipites, petiolorum basibus vaginantibus fere celatæ, mox dissolutæ.

Flores in alveolis 1–3-ni purpurei: ♂ *petala* sepalis duplo longiora anguste lanceolata striata; *staminum* filamenta ad medium usque in tubum trigonum coalita, antheræ loculis estipitatis. *Fl.* ♀ *corolla* calyce vix longior; *tubus stamineus* ore in lobos 6 digitiformes demum stellato-exsertos fissus. *Baccæ* ovales $\frac{1}{2} \times \frac{3}{8}$-pollicares, tuberculosæ.

Var. MONTICOLA, luxurians, vel potius species propria: *caudice* robusto 8 lineas lato remote annulato (spatiis interannularibus 3–4-pollicaribus); *foliis* maximis, pinnis nonnunquam interrupte 4–5-jugis, venis utrinque 29–30 et laciniis 20 pollices longis; *spadice* 11-unciali ramos 7 proferente.—*Hab.* secus cataractas fl. Negro in vertice montis "Serra de São Gabriel" dicti (*S. hb. Palm.* 33).

38. G. PERSONATA, sp. n.

Hab. Ad cataractas fluvii Negro, socia *G. densiflora* (*S. hb. Palm.* 34).

Palma altitudine prioris; annulis confertis; foliis simili modo pinnatisectis, pinnis 3-jugis pedalibus rhomboideo-loriformibus falcato-acuminatis, vel 4-jugis pinnis alternis angustioribus, venis utrinque 26.

Spadices 9-pollicares simpliciter ramosi, ramis 3–5, longitudine 4–5 pollicum, crassissimis; *alveoli* densissimi 8-stichi, labio inferiore magno late ovato obtuso retusove fornicato ringente (unde florem personatum simulant).

Flores iis *G. densifloræ* fere omnino conformes. *Baccæ* 7×5-lineares ovales vel ovoideæ muticæ; pericarpio sicco fere lineam crasso; albumine seminis corneo, embryone paulo supra ejus basin laterali elongato minute tuberculoso.

Obs.—Distinguishable from the preceding, even when growing, by the longer thicker branches of the spadix; but the essential difference is in the large ovate (not obcordate) lip of the alveoles. The resemblance of the alveole to a labiate or personate corolla is enhanced by the floral envelopes of effete flowers persisting within the cavity, and protruding so as to resemble a pendulous lip, opposite to which the true lip of the alveole overarches like a galea.

40. G. ASPIDIIFOLIA, sp. n.

Hab. in sylvis fluvii Tarumá fl. Negro defluentis (*Spruce, herb. Palm.* 75).

Caudex 3-pedalis, tenuis, diametro Arundinis culmi, fuscescens.

Folia parva pinnatisecta; *petiolus* tenuis 8-pollicaris; *lamina* 6–7-pollicaris (secus costam mensa); *pinnæ* 3-jugæ oppositæ rhomboideo-acinaciformes acumine filiformi, terminales duplo longiores; *venæ* primariæ utrinque 20, 4–6 pollices longæ, basi angulo acuto in costam decurrentes, medio tam recurvæ ut angulum rectum cum costa efforment, apice iterum incurvæ.

Spadices infra frondes oriundi, parvi, simpliciter ramosi, suberecti; *pedunculus* 1¼-pollicaris spathis velatus apice trifidus, ramis 2–2½-pollicaribus sat validis rufescentibus; *alveoli* obscure 5-stichi, subrotundi, labio inferiore brevissime emarginato. *Spathæ* 1¾-pollicares, fusiformes, pro genere firmæ et diutius persistentes, dorso carinatæ, ventre rimosæ.

Flores lati, ante anthesin ovato- vel subgloboso-trigoni. *Fl.* ♂: *petala* sepalis fere duplo longiora, plus minus alte connata; *filamenta* staminum ad medium usque coalita, apice bicrura, cruribus introflexis antherarum loculis æquilongis. *Fl.* ♀: *tubus stamineus* profunde 6-fidus, lobis digitiformibus. *Baccæ*......

41. G. TUBERCULATA, sp. n.

Hab. in sylvis ripariis fl. Negro secus ejus ostia (*Spruce, herb. Palm.* 18).

Caudex........tenuis virescens, diametro 3-lineari.

Folia 4 vel 5 contemporanea, parva (10–12-pollicaria), pinnatisecta; *pinnæ* bijugæ rhomboideo-acinaciformes, abrupte tenuiacuminatæ, termiminales 6×2-pollicares; *venæ* primariæ utrinque 12 solum.

Spadices 7-pollicares simpliciter ramosi; *pedunculus* tenuis 3½-pollicaris; *rami* 5 v. 6, bipollicares; *alveoli* obscure 5-stichi, labio inferiore emarginato vel breviter bifido. *Spathæ* 3-pollicares, lanceolatæ, cito laceræ, tametsi diutius persistentes.

Flores ♂ ....; ♀ *calyx* corollam fere æquans. *Baccæ* globosæ magnitudine pisi minoris, in sicco grosse tuberculatæ; epicarpium tenue sicciusculum; endocarpium tenue osseum. *Seminis* testa membranacea, tenuissima, vasibus rhaphis ad dimidiam peripheriam et ultra percursa; *embryo* hilo proximus.

42. G. PARAENSIS, sp. n.

Hab. in sylvis flum. Amazonum prope Pará (*Spruce, hb. Palm.* 69).

Caudex...........

Folia pinnata; *pinnæ* sub-11-jugæ latiusculæ (14×1-pollicares) dissitæ, elongato-lanceolatæ acumine tenui, planiusculæ, basi parum reduplicatæ, sub-5-veniæ, terminales pluriveniæ, venis angulo 70° tendentibus.

Spadix imperfectus mihi aderat, et utrum simpliciter ramosus, anne potius ramis trifidis paniculatus, e specimine non licet dicere. *Rami* (ramulive?) elongati 7-pollicares, puberuli mox calvi; *alveoli* obscure 5-stichi, labio inferiore limbo semiannulari perangusto emarginato constante.

Flores parvi: ♂ *calyx* corolla fere dimidio brevior; *antherarum* loculi et filamenta prælonga. *Fl.* ♀ andrœceum ore digitato-sexfidum.

43. G. NEGRENSIS, sp. n.

Hab. in sylvis præcipue humilioribus secus fluviorum Negro et Casiquiari confluentiam (*Spruce, hb. Palm.* 70).

Caudex 8-pedalis, diametro semipollicari.

Folia sub 7 contemporanea 3-pedalia pinnata; *petiolus* vix pedalis ad basin præcipue stuppa albida dense vestitus serius denudatus; *pinnæ* 20-jugæ, dissitæ, 13 pollices longæ, semipollicem latæ, lineari-lanceolatæ, basi parum angustatæ et reduplicatæ, apice longe sensim acuminatæ, valide 4–7-veniæ, venis angulum 65°–70° cum costa efformantibus.

Spadices vix semipedales simpliciter ramosi; *rami* 5, 3½-pollicares, flexuosi setuloso-puberuli; *alveoli* obscure 6-stichi confertiusculi, labio inferiore profunde bifido patulo. *Spathæ* sub-4-pollicares pedunculum vaginantes et intra petioli basin validam amplexicaulem absconditæ, firmæ, demum laceræ.

Flores in alveolis 2–3-ni. *Fl.* ♂ *petala* calycem subduplo superantia ad medium usque coalita; *styli* 3 steriles brevissimi in floris fundo. *Fl.* ♀ *andrœceum* apice digitiformi 6-fidum.

NUNNEZHARIA, *R. et Pav.* (1794).

Chamædorea, *Willd.* (1803).

This genus, although placed so far apart from *Geonoma* in the arrangement of Kunth, is plainly its near ally. The slim graceful habit is the same; and so is the essential character of the tripartite ovary, the two minute, abortive, and indurated carpels persisting at the base of the ripened fertile carpel, as they sometimes do in *Geonoma*. The differences, however, are numerous and important, viz. rhachis exalveolate, inflorescence dioicous, calyx gamophyllous, anther-cells connate, andrœceum wanting to ♀ flowers, berries with polished cuticle, &c.

I gathered but one species, certainly referable to *Nunnezharia*, viz. the *N. fragrans* of Ruiz and Pavon, which is widely distributed along the eastern roots of the Peruvian Andes, having been gathered by those authors in the space between the rivers Huallaga and Ucayali, and by myself on the western side of the Huallaga, in the hills of Tarapoto, at an elevation of 2000 to 3000 feet. There it forms large beds under the tall trees, and perfumes the forest far and wide, with its orange-coloured male flowers, all through the latter half of the year, but especially in the month of August. The Peruvian girls, who call it "Sangapilla," stick it in their hair, put it under their pillows, and use it largely in decorating the little crosses which they set up at the junction of forest-paths. My specimens, dried fourteen years ago, still give out their fine odour of mignonnette with a dash of primrose when hot water is poured on them.

Whether or not this premorse-leaved species be truly a congener of the others, with entire pinnæ, referred to *Chamædorea* by Martius, there can be no doubt that the name *Nunnezharia* has precedence and must stand.

1. N. FRAGRANS, *R. et P. Syst.* 297; *Prodr.* 137, t. 31.

Hab. in Chinchao et Cuchero nemoribus Peruviæ (*R. et P.*); in sylvis Andium orientalium inferiorum prope Tarapoto (*S. hb. Palm.* 65).

Caudices gracillimi, diametro $\frac{1}{2}$-pollicari, virescentes, annulis spatio 2-pollicari sejunctis notati, flexuosi, inclinati, raro erecti.

Folia sub sex contemporanea, simplicia bifurca, glaberrima; *petiolus* basi in vaginam integram 4–5-pollicarem superne paulo ampliatam dilatatus, proprius pollicaris vel etiam brevior; *lamina* profunde acuteque bifurca, furcis 14–15-pollicaribus, vix ultra sesquipollicem

latis, lineari-rhomboideis, margine interiore integerrimis, exteriore apicali crenato-incisove-præmorsis; *venæ* utrinque 12 rectæ acutissimæ (angulo 18°).

Spadices infrafoliares, plus minus penduli, solitarii, 6–12-pollicares, tenuissimi, ramos 2–6 (raro 0), nonnunquam ad 9 pollices longos, flexuosos glaberrimos sulcatos haud tamen alveolatos proferentes; spadice ♀ in diversa stirpe sæpius ramis paucioribus longioribusque fructu corallinis gaudente. *Spathæ* 3 membranaceæ, compressæ, fere complicatæ, antice rimosæ et sæpius laceræ, in pedunculo persistentes v. tempore florum caducæ.

Flores dioici: ♂ solitarii confertiusculi squarrose patuli. *Calyx* minutus ($\frac{1}{20}$-pollicaris) submembranaceus cupularis trifidus, laciniis orbiculari-ovatis nigro-limbatis. *Corollæ* petala $\frac{3}{20}$-pollicaria, longe ovalia cymbiformi-concava inflexo-valvata coriacea carnosulave[*]. *Stamina* 6 (raro 7–9) corollam vix dimidiam æquantia; *filamenta* basi in membranam brevissimam coalita, lata, compressa, carnosula; *antheræ* loculi oblongi basi connectivo brevi lateraliter adnati, apice longe liberi introrsi. *Pistillum* sterile (rarissime fertile) staminibus duplo longius corollam fere æquans profunde tripartitum, laciniis erectis appressis; in nonnullis floribus integrum trisulcum. *Fl.* ♀ fructuum basin stipantes fragmentarii (novellos non vidi). *Calyx* maris, sed crassior. *Corolla* 3-partita, laciniis jam ruptis sed (ut videretur) subrotundis. *Ovarium* tripartitum, carpellis 2 abortivis minutis ad carpelli fertilis basin persistentibus et indurescentibus. *Baccæ* nigræ nitidæ lævissimæ, semipollicem longæ, ovales subgibbæ acutiusculæ monospermæ; *epicarpio* pergamineo, *mesocarpio* tenui viridi insipido; testa seminis nigrescens firma vasibus rhaphis laxe reticulatis operta.

2. N.? GEONOMOIDES, sp. n.

Hab. in sylvis excelsis montis Campana Peruviæ orientalis, alt. 3000–4000 ped. (*S. hb. Palm.* 67).

Caudex 3-pedalis tenuissimus.

Foliorum petiolus pedalis tenuis basi longe vaginans, vagina integra pro spadicis emissione antice rupta; *lamina* obovato-cuneata profunde bifurca, 8-linearis (ad rhachim mensa), sed 15-linearis ad furcarum apices usque, glaberrima, furcis apice vix acuminato subfalcatis; *venæ* utrinque 10, directione 25°.

Spadices fere sesquipedales tenues glaberrimi simpliciter ramosi; *pedunculus* 10-pollicaris secus apicem arcuato-pendulus; *rami* semipedales tenuissimi flexuose patuli alveolati, *alveolis* oblongis cymbiformibus, solitariis, sparsis, raro hic illic subconfertis, unifloris.

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[*] Nonnunquam petala duplo numero sunt, 3 seriei interioris paulo minoribus; et haud raro petalum supplementarium unicum invenitur, cæteris duobus abortivis obsoletisve. Simili modo stamina variant.

Spathæ 2 pedunculum floriferum excedentes, a basi usque ad 8 pollicum altitudinem integræ et pedunculum arcte vaginantes, apice 2–4-pollicari anguste fusiformi antice ruptæ et cito fibroso-dissolutæ.

Flores omnes quos vidi ♂ nondum aperti. *Calyx* annularis alveolo semiimmersus breviter trilobus transverse corrugatus, lobo inferiore subaltiore, unde alveoli cum calyce solo persistente cunabuliformes evadunt. *Corolla* e petalis 3 suborbicularibus valvatis, calyce triplo longioribus. *Stamina* 6 biseriata corolla inclusa eidem ipsa basi adnata et brevissime monadelpha; *filamenta* brevia compressa, connectivo incluso subulata; *antheræ* erectæ turgide oblongæ basi apiceque profunde emarginatæ, loculis ad latera dehiscentibus. *Pistilli* rudimentum staminibus æquilongum et cum serie interna basi concretum, subteres, apice truncato disciformi.

Obs.—An huc referenda, quum nec flores ♀ nec fructus vidi, et spadice distincte alveolato gaudeat, valde dubius sum.

MORENIA, *Ruiz et Pav. Syst.* 299.

A genus distinguished from *Nunnezharia* by the presence of an andrœceum of six sterile filaments in the ♀ flowers, and by the spadices (at least the males) being whorled. In *M. fragrans* they are said to be 4-nate in the ♂ plant, solitary in the ♀. In *M. Pöppigiana* (the only species known to me) I have found them 6-nate in the ♂ plant. The ♀ flowers I have not seen; but the tripartite ovary, although not specially mentioned, is plainly indicated in Martius's description of the two species known to him, even the fruit being sometimes triple, in consequence of all the three carpels being fertile. *M. fragrans*, R. et P., has "Baccæ 3 monospermæ," and *M. Poppigiana*, Mart., "Baccæ nunc 3 in singulo flore evolutæ, nunc *unica stigmatibus* 3 *excentricis notata.*"

1. M. POPPIGIANA, *Mart. Palm.* 161, t. 140, 141.

Hab. in valle Huallaga fluvii provinciam Maynas Peruviæ perfluentis, prope confluentem Chincao, locis rupestribus sylvaticis (*Pöpp. in Mart.*); in eadem valle, in sylvis excelsis ad pedem montis Campana, ipse legi (*S. hb. Palm.* 58).

Caudices 6-pedales tenues distanter annulati. *Folia* 7-pedalia (petiolo proprio pedali ejusdemque vagina pedali integra inclusis), ambitu longe lanceolata pinnata, glaberrima; *pinnæ* 28-jugæ, inferiores suboppositæ, 20–22-pollicares, longe lanceolatæ tenuiacuminatæ parum falcatæ, basi fere verticali insertæ, præter costam mediam quadriveniæ, pluries plicato-striatæ; pinnæ superiores dimidio breviores alternæ.

Spadices ♂ verticillati, 6 ex unica folii vagina dissoluta erumpentes, vix pedales (pedunculo subsemipedali incluso), simpliciter ramosi,

glaberrimi, albi; *rami* 20 et plures patuli 2–3-pollicares spicæformes, solitarii v. inferiores binati, sulcati sed non alveolati. *Spathæ* 3, per pedunculum sparsæ, imbricato-vaginantes (suprema pedunculum plerumque longe excedente), elongato-fusiformes, subacuminatæ, antice rimosæ demum plurifissæ, 2–4 pollices longæ, papyraceæ, pallide virides, intus albidæ.

Flores ♂ conferti 2–4-natim aggregati $\frac{1}{10}$–$\frac{1}{8}$ poll. longi. *Calyx* minutus cupularis trigonus membranaceus. *Corolla* coriacea carnosula enervis; *petala* 3, ovalia, tertio fere orbiculari, valvata. *Stamina* 6 corolla breviora; *filamenta* tenuiuscula basi brevissime monadelpha; *antheræ* dorsifixæ, loculis erectis parallelis oblongis basi et præcipue apice liberis, rima laterali dehiscentes, connectivo brevissimo. *Pistillum* sterile tripartitum, filamentis subæquilongum iisdem basi ipsa concretum.

LEOPOLDINIA, *Mart.*

Leopoldinia is allied to *Geonoma* in habit (although more robust), in the alveolate spadices, the imbricated sepals and valvate petals of the flowers of both sexes, the trifid ovary, &c.,—but differs abundantly in the stamens being free except at the very base, and not united halfway up into a trigonous tube, in the erect and combined anther-cells, and from both *Geonoma* and *Nunnezharia* in the presence of an endocarp consisting of several layers of stout interlaced fibres which are obviously the homologues of the retiform leaf-sheaths. From *Euterpe*, *Œnocarpus*, &c. it is widely separated by the petals of the female flowers being valvate, not convoluto-imbricate.

I regret not having profited by my opportunities to make a thorough examination on the spot of the female inflorescence and fruit of these beautiful palms; for *L. pulchra* and *major* abound along the shores, and on sandy and stony islands of the Rio Negro and other black-water rivers of the Amazon-Orinoco region; while the cordage-yielding *L. Piassaba* is almost equally abundant in low sandy flats of the adjacent forests *.

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* Those botanists who persist in calling this palm "*Attalea funifera*," because its beard, so much employed in the manufacture of cordage, brooms, &c., bears the same name (*Piassaba*) in commerce as that of the true *Attalea funifera*, might any time during the last twelve years have convinced themselves that Mr. Wallace and myself have correctly referred it to *Leopoldinia*, by consulting my specimens in the Herbarium and Museum at Kew.

For a fuller account of *L. Piassaba*, its distribution and uses, I must refer to Mr. Wallace's book (Palms of the Amazon, p. 17), and to my own description (Linn. Soc. Journ. 1860, iv.), whereof I reproduce below only what is essential to understanding the species.

The fruits are perhaps unique among Palms in being much compressed laterally—so much so in *L. pulchra* as to be scarcely half so thick as broad. The epicarp in all the species is of a dull red colour. The fleshy mesocarp of *L. pulchra* and *major* has the disagreeable bitter flavour of the fruit of *Iriartea exorrhiza*; but in *L. Piassaba* it is sweet and edible.

In my account of *L. Piassaba* in the Linnean Society's Journal, I followed Martius in describing the fruit of *Leopoldinia* as a "berry," and the endocarp as a sarcocarp; but renewed examination has convinced me that the thick inner envelope, consisting of several layers of interwoven horny or woody fibres, is a true endocarp, corresponding in structure to the endocarp of *Astrocaryum*, &c., except that the interstices of the layers and fibres are open, not closed with woody matter as in other palm-drupes; while between the endocarp and the cuticle there is a true fleshy mesocarp (sarcocarp) like that of many other palm-fruits which have, or not, a distinct endocarp. A further proof of its being truly an endocarp is in the presence of a large foramen near the base, over the embryo, loosely stuffed with cottony matter *.

1. L. MAJOR, *Wallace, Palms of the Amazon*, pl. 5: caudicibus pluribus ex eodem rhizomate ortis, secus apicem vaginis petiolorum reticulatis persistentibus circumtextis; foliis vix 5-pedalibus æqualiter pinnatis, pinnis sub-28-jugis lineari-lanceolatis acuminatis pendulis; spadicibus sesquipedalibus ter divisis dense ferrugineo-tomentosis; bracteolis margine nudis; pistillo sterili florum ♂ subintegro; drupis subrotundis insigniter compressis.

Hab. in ripis, etiam in insulis inundatis fluviorum Negro, Pacimoni, Vasiva et Atabapo, ubi gregarie crescit (*Wall. loc. cit.*; *S. hb. Palm.* 24), *Jar-áçú* Brasiliensium dicta.

Palma muticaulis, caudicibus usque ad 24 ex unico rhizomate ortis, 15–20-pedalibus, diametro 3-pollicari, erectis, rarius arcuatis recumbentibusve, secus apicem petiolorum vaginis reticulatis fragilibus obvelatis, inferne nudis, crebre annulatis.

Folia 4–5-pedalia arcuato-patula pinnata; *petiolus* 14-pollicaris compressus anceps, basi vaginatus, vagina opere retiformi constante; *rhachis* fere $3\frac{1}{2}$-pedalis, subtus convexa, squamulis laciniatis deciduis plus minus lepidota; *pinnæ* sub-28-jugæ, æquidistantes, alternæ v. suboppositæ, sæpius fere exacte pendulæ, lineari-lanceolatæ sensim acuminatæ, 3–5-plicatæ, apice inæqualiter bifidæ, basi reduplicatæ et tuberculo axillari auctæ, inferiores angustiores, mediæ 18 × 1-pollicares, apicales multo breviores.

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* So Martius: "fibris . . . . juxta basim deficientibus et foramen magnum massa fibroso-struppea obturatum formantibus."

Spadices inter frondes oriundi, ambitu late triangulares, ter divisi, dense ferrugineo-tomentosi, masculo cum fœmineo sæpius in eodem caule alternante; *rami* tenues, pilis ferrugineis stellatim 3–5-fidis tomentosi; *alveoli* sat conferti, haud profundi, sæpius 1–2-flori, nempe floribus ♂ 2, flore ♀ intermedio obsoleto vel 0, vel e contrario (in spadice fertili) floribus ♂ obsoletis, flore ♀ solo perfecte evoluto. *Bracteolæ* florum intra alveolos persistentes, exterior cordato-triangularis, 2 interiores oblato-rotundatæ, omnes haud raro amorphæ, dorso subtomentosæ. *Spathæ* 2 fusiformes membranaceæ rufescentes cito caducæ.

Flores ♂ : *sepala* corolla triplo breviora, oblato-cordata rotundata, dorso medio gibba, late imbricata. *Petala* late ovata, basi subcordata, valvata, coriacea, extus glandulis sparsis punctata. *Stamina* 6 corollæ æquilonga; *filamenta* ovato-subulata, basi ipsa coalita, carnosa; *antheræ* breves suborbiculares dorsifixæ (versatiles). *Pistillum* sterile trigonum subintegrum. *Flores* ♀ examinare non potui.

Obs.—In *L. pulchra*, Mart., cum *L. majore* sæpe in loco natali consociata, *caules humiliores et subsolitarii* sunt, *vaginis* reticulatis *validis* operti; *foliola* pauciora *subhorizontalia nec pendula*; alveoli magis dissiti; *bracteolæ ter latiores quam longæ,* semiannulares; &c.

This species, well figured by Mr. Wallace in his 5th plate, except that the clustered stems are not represented, abounds on the Rio Negro, and on the black-water tributaries of the Casiquiari and the Orinoco. It does not extend down to the very mouth of the Rio Negro, and I first noticed it at about halfway up to the confluence of the Rio Branco. Below that point, the Jará (*Leopoldinia pulchra*) is the only species of the genus; but it accompanies its loftier congener throughout its whole range, and I have observed it also on the Tapajoz and Trombetas, black-water tributaries of the Amazon, where *L. major* is not known to exist.

L. major is easily distinguished by its tall *clustered stems*: I have counted as many as 24 from a single rhizome, which was invested by a dense intricate mass of white radicles. Young stemless plants often form a continuous fringe to inundated islands, and at a distance resemble large aquatic grasses. The leaves are pendulous, as in the Assai palm (*Euterpe edulis*); while the netted leaf-sheaths are much frailer and decay more rapidly than in the humbler species (*L. pulchra*), which has them firm and woody, clasping the stem like so many gauntlets, and persisting almost down to its very base.

I have what I suppose to be *L. pulchra* from three localities: 1. Santarem, at the mouth of the Tapajoz; 2. Rio Caipurú (an affluent of the Trombetas); 3. Rio Negro, left bank, stony beach

above Manaos. Possibly the three may include two species; but my specimens of all are incomplete.

I did not meet with Martius's second species, *L. insignis*, "pinnis subtus glaucis," found by him in the province of Pará.

2. L. Piassaba, *Wallace, Palms*, pl. 6: caudice solitario robustiore barba petiolorum persistente velato; foliis 15-pedalibus æqualiter pinnatis, pinnis sub-60-jugis linearibus acuminatis patulis; spadicibus 4-pedalibus quater divisis minus dense fulvo-tomentosis; bracteolis fimbriatis; pistillo sterili florum ♂ tripartito; drupis subglobosis parum compressis.

Hab. per tractus sylvarum Amazoniensium a fluvio Padauirí, flumini Negro affluente, ad Orinoci cataractas usque, in arenosis depressis quibus tempore pluvioso aquæ imbrium colliguntur, ibidemque latas plagas efformat (*Spruce in Linn. Soc. Journ.* iv. 58; *hb. Palm.* 50). *Piaçaba* Brasiliensium, *Chiquichiqui* ab Orinocensibus dicta; *Titía* Indorum Barré est.

Caudex solitarius 20–40-pedalis, barba petiolorum omnino velatus, vel in ætate, barba marcida delapsa, apice solo barbatus.

Folia 15-pedalia arcuato-patula æqualiter pinnata; *petiolus* 4½-pedalis basi vaginans, vagina antice fibroso-reticulata ore in barbam pendulam rufo-badiam tenacem 1¾–4½ pedes longam producta; *pinnæ* sub-60-jugæ, horizontales, apice solo pendulæ, lineares acuminatæ, glaberrimæ.

Spadices 4-pedales arcuato-penduli quater divisi, ambitu triangulari-acuminati, tomento pallide fulvo haud dense vestiti; *pedunculus* 14 pollices longus, 9 lineas latus, valde compressus; *rhachis* superne polygona; *rami* primarii sub 25; *ramuli* floriferi tenues profunde alveolati. *Alveoli* 3- (sed ex abortione 2- v. 1-) flori. *Spathæ* 2 membranaceæ fusiformes rufescentes, mox deciduæ laceræve.

Flores polygamo-monoici dioicive, odore suavi *Resedæ* scatentes. Fl. ♂: *bracteolæ* ex alveolis altius emersæ (quam in *L. majore*) subacuminatæ insigniter fimbriatæ. *Sepala* oblato-orbicularia subovatave fimbriata, imbricata. *Petala* late ovata, valvata, sepalis triplo longiora. *Stamina* corolla subbreviora; *filamenta* lineari-subteretia basi ipsa coalita; *antheræ* suborbiculares versatiles. *Pistillum* rudimentarium filamenta fere æquans tripartitum.—Fl. ♀ sæpe ad distinctos ramulos v. etiam in diversis spadicibus, dissitiusculi. *Calyx* e sepalis 3 reniformibus valde oblatis late imbricatis margine attenuato fimbriatis. *Petala* duplo et ultra longiora, ovato-triangularia valvata coriacea. *Andrœceum* sterile adest filamentis 6 subulatis liberis constans. *Ovarium* trigono-turbinatum, apice depresso-trifidum, carpidiis duobus sterilibus demum ad unici fertilis basin persistentibus verruciformibus; *stigmata* 3 sessilia linearia recurva papillosa, sub fructus grossificatione valde excentrica. *Drupæ* (vix maturæ) 21 lineas

longæ, 18 lineas latæ, 15 lineas crassæ, oblongo-globosæ subcompressæ basi subgibbæ; *epicarpium* membranaceum sordide sanguineum, *mesocarpium* carnosum (edule); *endocarpium* crassum, prope basin foraminatum, laminis plurimis constans; lamina extima e fibris validis corneo-lignescentibus intertextis anastomosantibusque, interioribus e fibris tenuioribus solum intertextus formatis. *Testa* seminis tenuis membranacea badia, ex endocarpio separabilis, raphes vasibus pallidis obscure radiantibus extus percursa.

Obs.—So long as this palm does not exceed 10 to 20 feet in height, it has the stem enveloped to the very base in the persistent beard of the petioles; but when it grows higher, the beard usually falls away in a mass, leaving at the top merely the short beard that depends from the crown of existing leaves. The former state is represented in Mr. Wallace's plate, which, however, gives the palm a stunted aspect it does not really possess, in consequence of the leaves being shown only half so long as they ought to be, in proportion to the thickness of the stem; those I measured were from 15½ to 16½ English feet long, and had never fewer than 60 pairs of pinnæ.

The petioles are about 4½ feet long, and for about 8 inches at the base they sheath the stem, being concavo-convex at the back, and in front consisting of a network of crossing brown ribands or flat threads, which are prolonged into a pendulous beard, as much as 4 feet 9 inches long on young plants, but dwindling as the plants increase in height, so that in a specimen 40 feet high I found the beard but 1 foot 9 inches long.

The spadices reach 4 to 5 feet in length, and are four times branched, the ultimate and floriferous ramuli being very slender as in every species of this genus. The male flowers exhale a delicious odour of Mignonnette, like that of *Mauritia* (*Orophoma*) *Caraná*, Wallace.

The fruits (of which I saw only unripe specimens) are 1¾ inch long, nearly as broad, and somewhat compressed, but much less so than in *L. pulchra* and *major*; and the fleshy mesocarp has scarcely any of the bitterness of that of the other species, so that, when triturated with boiling water, it affords a creamy "wine," said to be even more delicious than that of Assaí.

WETTINIA, *Pöpp. et Endl.*

Having already, in the Linnean Society's Journal for April 1859 (vol. iii. p. 194), fully discussed the characters and affinities of this genus, vindicating for it a place among true Palms, by the side of *Iriartea*, and not intermediate between Palms and Cyclanths as suggested by Pöppig and Endlicher, I need not here recapitulate my arguments. Its most obvious distinction from *Iriartea* is in the villose fruits, so densely packed on the spadices as to seem concrete; but a far more important one resides in the long narrow floral envelopes, and especially in the subulate petals of the ♀ flowers being not at all imbricated, so different from the orbicular convolutely imbricated petals of *Iriartea*. The basal embryo is shared with Wendland's genera *Catoblastus* and *Dictyocaryum*, which I suppose subgenera of *Iriartea*, although I am open to correction on this point; for all I know of them is derived from Wendland's description of the fruit alone, in the 'Bonplandia' for 1860.

Since I first found *Wettinia Maynensis*, in November 1855, at a height of 3000–4000 feet on the Andes of Maynas (lat. 6½°–7° S.), in valleys running down to the great valley of the Huallaga, I have traversed the whole of the eastern roots of the Andes, thence to the equator, and have seen the same species growing at various points throughout that distance, and even occasionally descending to 1000 feet on the river Pastasa. In ascending that river it becomes more and more frequent, until in the forest of Canelos (lat. 0°–2° S.) it is the most prominent feature of the vegetation. It often grows along with *Iriartea ventricosa* and *exorrhiza*, from which it is distinguished at sight by the long semilanceolate pinnæ being equidistant and all spreading out horizontally, but pendulous (from their weight), so that the entire leaf has a widely channelled form. But the Iriarteas have the flabellate pinnæ usually deeply cloven, the uppermost lacinia of each pinna standing out above the rhachis, the lowest pendulous, the rest at intermediate angles. Everywhere it preserves the same character; and the only feature not noted in my previous description of it is that the whorled spadices, usually three on a leaf-ring (the two lateral ones ♂, the medial ♀) are sometimes double that number, but never more. Considering this uniformity over so large an area, it has struck me that possibly Pöppig's original species (*W. augusta*), gathered only a little further to the southward than mine, in the same valley of the Huallaga, was not distinct from the latter. I could not, however, presume to identify them from Pöppig's description. In my plant a notable and constant character is that the spadices are branched, the branches being fasciculated, mostly five in the ♀ spadix, and eight in the ♂ spadix. But, according to Pöppig, his *Wettinia augusta* has from eight to fifteen *simple* spadices springing from each whorl. When I sent to Kew a specimen of the ♀ spadix of *W. Maynensis*, finding it far too bulky for the space I had reserved for it, I cut away all the branches but one. Can Pöppig (I have thought) have done the same, and have omitted to note that his specimen retained only one branch of the five (or eight) it originally possessed? Such a mistake is hardly possible to have occurred; and until his plant can be re-found, and shown not to correspond with his account of it, I must continue to consider it distinct from mine.

I reproduce below the specific characters of the two species, and so much of my detailed description of *W. Maynensis*, from the Linnean Journal, as it seems desirable to preserve here.

1. W. AUGUSTA, *Pöpp. et Endl. Nov. Gen.* ii. 39, t. 153 et 154: rhizomate conico e radicibus arcte sibi invicem impositis conflato; pinnis 18–20-jugis; spathis propriis 2; spadicibus simplicibus, pluribus (8–15) ex eodem verticillo ortis.

Hab. "in Peruviæ Transandinæ sylvis pulcherrimis obumbrantibus, quibus arcetur ripa borealis fluvii Tocache" (*Poeppig, loc. cit.*).

2. W. MAYNENSIS, *Spruce in Linn. Journ.* April, 1859, vol. iii. p. 194: rhizomate conico e radicibus dissitiusculis conflato; pinnis 38–40-jugis; spathis propriis 3; spadicibus apice congesto-ramosis, paucis (3–6) ex eodem verticillo ortis.

Hab. in convallibus Andium Maynensium umbrosis, præcipue secus rivulos, alt 3000′–4000′, sociis *Iriartea ventricosa*, Mart., *exorrhiza*, Mart., et *deltoidea*, R. et P.; necnon per Andium Æquatorialium radices valde frequens, rarius in planitiem ipsam Amazonicam descendens.

Caudex radicibus strictis subaculeatis e terra emersis et in conum 3 pedes altum conniventibus sustentus, erectus, 30–40-pedalis, diametro 4-pollicari, annulatus, inermis, nudus.

Folia pauca (5 v. 6) contemporanea, 12-pedalia, æqualiter pinnata, patula; *petiolus* vagina prælonga 3¼-pedali integra subinflata constans; *pinnæ* 38–40-jugæ, infimæ diminutæ, mediæ 3-pedales latitudine 3-pollicari, e basi semiverticali cuneata dimidiato-lineari-lanceolatæ, apice obtusato- vel truncato-præmorsæ, margine antico apiceque incisæ, dentibus præmorsis subacutisve; *venæ* plurimæ, basi fere contiguæ, superne magis dissitæ et in dentes marginales excurrentes.

Spadices unisexuales, 3 ex eodem verticillo orti, sc. medius ♀, laterales ♂; vel 6 simili modo dispositi. *Spadicum ♂ pedunculus* 6-pollicaris obsolete trigonus, pro spatharum insertione 6-annulatus, annulo sup-

plementario apicali vaginam bilabiatam (quasi spatham rudimentariam) gerente, apice in ramos circiter 8, confertos, simplices, 6-pollicares, teretes, minute pannosos, spiraliter areolatos, floribus dense obtectos, ante florationem sinistrorsum circinatos, postea subrectos divisus. *Fl.* ♂: *sepala petalaque* squamæformia, crassa, rigida, castanea, subpuberula, tuberculis paucis sparsa, æstivatione valvata; illa 3–5 (plerumque 4) late subulata obtusiuscula, lineam longa, libera vel rarius duo in unicum bifidum coalita; hæc 3, longissima (7 lin. longa) anguste subulata subflexuosa. *Stamina* 12–16 (sæpius 13), inclusa; *antheræ* paulo supra basin in filamento brevi (½–1 lin.) subulato compresso positæ, lineares, 4 lineas longæ, obtuse 4-gonæ, 2-loculares, longitudinaliter dehiscentes, pilis albidis flexuosis deciduis vestitæ, connectivo centrali tenui in mucronem curvulum producto; *pollen* globosum, læve. *Spathæ* 6: 3 exteriores (incompletæ *Martii*) cuneatæ, vaginæformes, subtrigonæ, 4-pollicares, primitus clausæ apiculatæ, postea apice irregulariter ruptæ, imbricatæ, persistentes; 3 interiores (completæ *Martii*) fere triplo longiores (11 × 3-pollicares), e basi vaginante fusiformes, breviter recurvirostræ, pergameneæ, minute pluristriatæ, arcte imbricatæ, pro spadicis emissione laceræ, caducæ; omnes spathæ pilis brevibus appressis fulvis subdeciduis vestitæ.

Spadicis ♀ *stipes* 10-pollicaris subcompressus adscendens apice decurvus et ramos 5–7 confertos, fere verticillatos, rectos, patulos, 8-pollicares, diametro (fructibus inclusis) fere 4-pollicari, proferens. *Sepala* 3, a basi prælata triangulari brevisubulata, 2–3 lineas longa, inter se subinæqualia. *Petala* 3, late subulata, subflexuosa, 5–6 lineas longa. *Ovaria* 3, ovalia, 3½ lineas longa, basi inter se et cum stylo coalita, villosa, 1-locularia, 1 vel sæpius 2 sterilia; *ovulum* unicum ex baseos angulo interno fere erectum, sessile, anatropum. *Stylus* unicus centralis, 7 lineas longus, trigono-subulatus, villosus, plerumque cum ovariis abortivis ad ovarii fertilis basin persistens, raro deciduus; *stigmata* 3, teretia erecto-flexuosa, 3 lineas longa. *Baccæ* 1-spermæ, siccæ, in spadice densissime collectæ, pressione mutua 3–6-angulari-obpyramidatæ, apice lato convexo, pilis cinereis subfasciculatis basi solidis superne tubulosis flexuosis villosæ. *Mesocarpium* molliter lignosum, tenuiusculum, apice incrassatum. *Endocarpium* membranaceum, rapheos vasibus adhærens. *Semen* 11 × 6-lineare, anguste ovali-obovatum subtrigonum; testa tenuis, firma, nigrescens, a basi ad apicem usque raphe tenui percursa et ejusdem vasibus albis complanatis adhærentibus reticulata, cum nucleo connata. *Albumen* æquabile, subosseum. *Embryo* in foveola basilari nidulans, conico-cylindricus ad nuclei centrum directus.

IRIARTEA, *Ruiz et Pavon.*

The handsome and singular palms included in this genus by Martius are distinguished from nearly all their coordinates, except *Wettinia*, by the three following very obvious characters: 1. Stem supported on a cone of emersed prickly roots; 2. Pinnæ flabelliform, præmorsely truncate and usually laciniate; 3. Spathes numerous, the number different in nearly every species.

The fruit may be regarded either as a berry, or as a drupe with a very thin endocarp, which has usually the peculiarity of being gelatinous.

The pulpy mesocarp is so bitter as to be inedible. The "embryo basilaris," supposed by Martius to be common to all the species, proves to belong to only a very few of them. One only of the three carpels of the ovary is fertile; and the stigmas, at first apical or central, do not in all the species retain that position on the ripened carpel, but in some persist near the base, and in others at about midway on the inner side, in consequence of the carpel swelling as it ripens much more at the outside than the inside (with respect to the axis of the flower). Similar, but not always corresponding, dislocations take place with the embryo, which is found in the different species in almost all possible positions between the base and apex of the seed, although, as it would appear, constant in position in the same species. These differences have been laid hold on by modern authors for breaking up this very natural genus into at least three (and it may be five) supposed genera, separated from each other by no difference of habit, or truly essential character of flower or fruit *. The characters

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* *Deckeria*, Karst. (=nearly *Iriartea*, Wendl.); *Socratea*, Karst.; *Iriartella*, Wendl.; *Catoblastus*, Wendl.; *Dictyocaryum*, Wendl. [Karsten, "Plantæ Columbianæ" in the 'Linnæa' for 1856, pp. 258–262; Wendland, "Bemerkungen über einige Palmengattungen Amerika's," in the 'Bonplandia' for 1860, pp. 100–106.]

I have kept notes on the structure of the fresh fruit of but three species of *Iriartea*; but they are types of as many genera of Karsten and Wendland:—

In *I. exorrhiza*, Mart. (*Socratea*, Karst.), I find the embryo at the depressed apex of the seed, barely within the hard horny albumen. Raphe of numerous flattened filaments, radiating from the base to the apex of the seed, subramose and anastomosing.

I. setigera, Mart. (*Iriartella*, Wendl.), agrees with *I. exorrhiza* in the apical embryo, but differs in the fruit having the stigmatic scar a little above the base, on the inner side, and not near the apex as in *I. exorrhiza*. The raphe divides thus assumed to be generic have their analogues in genera of exogens, where they are not considered of equal importance. Take, for example, the genus *Cordia*, which has an ovary of four uniovulate carpels, followed commonly by a monocarpellary fruit, tipped at the apex with the persistent stigmas, or at least with a stigmatic scar. But in the Cordias of the "nodosa" group (and I refer especially to one of my own gathering, *C. umbraculiferæ* var? Pl. Exsicc. 1234) the ripe fruit is a small, yellow, obliquely oblong, and mostly 1-seeded drupe, which increases in gibbosity as it ripens, so that when quite ripe the stigmatic scar is midway between the base and the geometrical apex, and the persistent calyx looks as if grown on to the side. But when two or more of the carpels are fertile, the obliquity usually disappears; while many species of the genus have even *solitary* ripened carpels symmetrical.

I was able to examine fully but two species of *Iriartea*, whose descriptions I reproduce below; but I fell in with some others, and *I. exorrhiza*, especially, is one of the commonest of Amazon palms, extending through the whole length of the great plain and some way up the moist Andine valleys, and northward as far as the borders of the savannahs of the Orinoco. In the Peruvian Andes, at from 2000 to 4000 feet, *I. deltoidea* grows along with it; and in the Equatorial Andes, at the same elevation, I have seen a very fine large-leaved *Iriartea* which I suppose undescribed.

1. I. VENTRICOSA, *Mart. Palm.* 37, t. 35, 36: caudice procero medio ventricoso; foliis 18-pedalibus pinnatis glabratis, pinnis plurijugis magnis cuneato-flabellatis apice sinuato-præmorsis demum 10-partitis; spadicibus vix bipedalibus, ramis 3-pedalibus pendulis; spathis 10–12; baccis globosis nigrescentibus.

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into not more than ten filaments, which I find slightly anastomosed, although Wendland describes them as quite free.

In *I. ventricosa*, Mart. (*Deckeria*, Karst.; *Iriartea*, Wendl.), the embryo is lateral a little below the middle of the seed, and the filaments of the raphe distinctly anastomose.

All these are so alike in habit, that the Brazilian Indians unhesitatingly give them the same generic name (*Paxiúba*); and a closer examination reveals so many essential resemblances, that the botanist will probably indorse the opinion of the savage, and continue to unite these palms under one title.

Perhaps *Ceroxylon* and *Wettinia* are the only genera of this group, with the stem supported on an emersed cone of roots, which ought to be kept separate from *Iriartea*.

Hab. in solo ochraceo nigrove feraci in sylvis primævis haud inundatis per regionem graniticam fl. Negro superioris, Casiquiari et Orinoco, ut etiam in tota planitie fluminis Amazonum superioris, et præcipue in Andium orientalium radicibus ubi ad 4000 pedum altitudinem usque ascendit. *Paxiuba barriguda* Brasiliensium, *Barrigon* Veneziolanorum, *Tarapoto* Peruvianorum (*S. hb. Palm.* 26).

Caudex solitarius, e cono radicum teretium subaculeatarum exsertarum æquilatero sub-6-pedali oriundus, 50–100-pedalis, diametro basali 8-pollicari, secus medium in ventrem fusiformem diametro 20-pollicari et majore dilatatus, secus apicem iterum cylindraceus gracilis, annulis spatio fere pedali dissitis notatus.

Folia pauca (sub 7) contemporanea, 18-pedalia, pinnata; *petiolus* subteres 4 pollices diametro, ejus vagina vix pedali; *rhachis* trigona, angulis superne magis acutis, tomento griseo appresso vestita; *pinnæ* plurijugæ cuneato-flabelliformes, basi cartilaginea reduplicata adfixæ, mox glabratæ, venis validis 10 plicisque æquiparantibus percursæ, et demum fere usque ad basin in lacinias 10 fissæ, lacinia infima multo longiore (5-pedali) latioreque, superioribus sensim decrescentibus, suprema vix ultra 2-pedali, omnibus laciniis apice late sinuato-dentatis et e venulis excurrentibus erosis denticulatisve.

Spadices longe infrafoliares, sæpe ex eodem annulo binati, $1\frac{3}{4}$-pedales, fructu maturato horizontales subpenduli; *pedunculus* $2\frac{1}{2}$-pollicaris, teres, basi abrupte dilatato-amplexicaulis; *rami* sub-3-pedales, diametro 4 lineas, conferti et basi dilatata subcontigui, simplices v. prope basin furcati, per totam longitudinem profunde alveolati. *Spathæ* plurimæ (10–12 teste Martio) imbricatæ, superiores ante anthesin, inferiores tardius, deciduæ.

Flores ♂ haud vidi; ♀ *sepala petalaque* late imbricata, sed fructu maturato jam dilacera mihi solum visa. *Baccæ* diametro 10 lineas, globosæ, subgibbæ, apice depressæ umbonatæque, nigro-badiæ; *epicarpium* tenue fragile; *mesocarpium* $1\frac{1}{3}$ lineam crassum molle sicciusculum; *endocarpium* . . . . .; *testa* seminis fragilis, vasibus rhaphes anastomosantibus percursa; *albumen* osseum; *embryo* subsuperficialis infra seminis medium lateralis, ab hilo $4\frac{1}{2}$ lin. distans.

This noble and curious palm is frequent on the Solimoens (or Upper Amazon); and still more all along the eastern roots of the Peruvian and Equatorial Andes, up to a height of from 4000 to 5000 feet. On the Amazon it is known as "Paxiuba barriguda," in the Andes as "Tarapoto." There is also much of it about the base of the granite hills of the Casiquiari, Upper Rio Negro, and Orinoco, where it is called "Barrigón."

Well-grown plants are from 60 to 100 feet high. In a specimen cut down at the cataracts of the Rio Negro, the whole height was 63 English feet; the cone of exserted roots $5\frac{1}{2}$ feet (but on another

plant as much as 12 feet, and on a very lofty one not quite 2 feet); the trunk proper 56½ feet. The fruit-bearing spadix was placed at a height of 45 feet from the apex of the cone, and 11½ feet below the lowest extant frond; on the third ring above that was a young decurved spadix exactly resembling a cow's horn, still closely invested by the numerous spathes, the lowest of which were beginning to fall away. Another interval of two rings, and there was another spadix, but only half so long and more rudimentary. Hence, as the fruit is ripened only once a year, it seems that the fruiting spadix is of three years' growth. The trunk was 8 inches thick near the base; at about halfway up it began to swell and form a belly, whose greatest thickness (20 inches) was a little above the lowest spadix. The belly sometimes occurs lower down the stem, and is often much wider than in this instance. On the Pacimoni I have seen canoes extemporized from it, by splitting off lengthwise a little less than the half of it, hollowing out the remainder, and stopping up the ends with clay.

From the horn-like young spadices this palm is sometimes called in Peru "Huacra-pona," or Horn Palm—a name, however, more commonly applied to its congener, *I. exorrhiza*, which has the same peculiarity. An analogous name, "Corneto," is given to another species (*I. pubescens*, Karst.) found in New Granada.

2. I. SETIGERA, *Mart. Palm*, 39, t. 37: palma humilis (10–20-pedalis) gracilis, tota superficie tomentella pubescensve, ad caudices vaginasque etiam setosa; foliis vix 5-pedalibus pinnatis, pinnis 7-jugis cuneiformi-rhomboideis apice præmorsis; spadicibus subbipedalibus, ramis pendulis; spathis 3 (4–5 *Mart.*); baccis obovato-cylindraceis incurvo-gibbis miniatis.

Hab. "in margine fluminis Japurá" (*Mart. l. c.*); in sylvis fluminum Negro, Uaupés et Casiquiari, præcipue humilioribus subhumidis, etiam ad flum. Amazonum supra fl. Negro ostia (*S. hb. Palm*, 4, *I. pruriens* in mst.; *Wallace, Palms*, pl. 15)—*Paxiuba-í* Brasiliensium.

Caudices solitarii humiles (10–20-pedales), radicibus vix vel non exsertis sparse muricatis suffulti, soboles prostratas apice adscendentes foliosas proferentes, tenues, diametro 1–2-pollicari, superne sensim attenuati, distanter annulati, dense griseo-tomentelli et inter tomentum nigrosetosi, setis deciduis et ad instar *Mucunæ* prurientibus.

Folia 4½–5-pedalia, pinnata, ambitu ovalia; *petiolus* (vagina 9-pollicari tereti subintegra dense setosa excepta) pedalis, teres, et rhachis tomentosa; *pinnæ* 7-jugæ, basi lata semiverticali insertæ, cuneiformi-rhomboideæ, apice præmorsæ (laciniato-dentatæ erosæque), mollissimæ, supra puberulæ, subtus tomentellæ, venis sub 6 flabelliformi-radiatis percursæ, obscure plicatæ, mediæ longiores 11 × 3½-pollicares.

Spadices $1\frac{1}{2}$–2-pedales, solitarii, simpliciter ramosi; *pedunculus* compressus tomentellus; *rami* subfastigiati elongati penduli alveolati. *Spathæ* 3 (solæ mihi visæ; anne potius 4 v. 5, una alterave jam decisa?) plano-convexæ, pedunculum arcte investientes, infima nuda, 2 superioribus tomentellis.

Flores ♀: *sepala petalaque* parva oblato-orbicularia medio crassiora, margine attenuata subciliataque. *Baccæ* obovato-cylindraceæ incurvæ miniatæ; *mesocarpium* tenuissimum; *endocarpium* membranaceum viride mucilaginosum, interne vasibus rhapheos adhærentibus sub 10 albis parce anastomosantibus vittatum; albumen albidum corneum apice fere exacte geometrico embryonem flavum cylindraceum fovens.

Of this slender little palm the natives commonly make their blowing-canes*. When I first found it and compared it with Martius's account of *I. setigera*, as abbreviated in Kunth's 'Enumeratio' (iii. 195), it seemed to me certainly distinct, and I called it in my MSS. "*Iriartea pruriens.*" Martius says of his *I. setigera* "spathæ 4–5" (I found but three, although one or more might have fallen away from my fruiting specimen),—and "bacca elliptica," but nothing about its being gibbous, and widened upwards, as I have always seen it. But the greatest discrepancy is in the height of the stem, which I have never seen above 20 feet, whereas Martius gives it as "sub-50-pedalis." Mr. Wallace, too, found it but 15–20 feet high. I have since seen it extending throughout the Rio Negro region, and preserving the characters I have assigned to it; but I dare not assume its diversity from Martius's plant without consulting his original specimens.

This is one of the very few palms that send out prostrate suckers from the root.

EUTERPE, *Mart.*

I have nothing to offer towards extending our knowledge of this genus beyond a full description of Mr. Wallace's *Euterpe caatinga*, although the Amazon valley appears to contain several other undescribed species, especially on the lower slopes of the Andes. The "Assaí," which affords a favourite drink to Amazonians of all castes and colours, although confidently referred by Mr. Wallace to *E. oleracea* of Martius, seems to comprehend two, and possibly three species. At Pará and elsewhere the Palm-tree itself is called "Yuçára" (written "Joçara" and "Jaçoara" by Marcgraff, and "Jissara" by Prince Maximilian); and it is only the fruit and the drink prepared from it that bear the name of "Açai" ("Çao-hy," according to Martius). The common species of the submaritime region, with slender usually inclined stems springing several from a root, is probably *E. edulis* (*Mart. Palm.* 33, t. 32). But the "Manaca" of Humboldt, which is the common Euterpe of the Rio Negro and Casiquiari, has a solitary stem, slender but firm, tall and straight, and it is doubtless what Martius has called *E. oleracea* (Palm. 29, t. 29, 30). In the lowlands at the junction of the Rio Negro and Amazon, I cut down one of these palms, whose trunk measured 71 feet to the base of the cylindrical leaf-sheaths or "cabbage;" the latter was 4 feet long, and the arched pinnate leaves 8½ feet more. I have seen other specimens 10 to 20 feet higher; and Martius affirms that they sometimes reach 120 feet.

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* See Mr. Wallace's account (*Palms*, p. 40) of the way these blowing-canes are made.

Two very pretty Euterpes (a larger one known as "Chonta," and a smaller one as "Chontilla") grow at the head of the valleys in the Peruvian Andes, at from 3000 to 6000 feet: and in the Forest of Canelos, at about the same height, there is a "Chontilla" so slender that walking-canes are made of it; and its habit is almost that of *Geonoma*, but the leaves, the edible cabbage, and the fruit, are all of *Euterpe*. I regret that I have nothing more definite to offer about these interesting palms.

All the species are notable for their concinnately pinnated leaves, with pendulous pinnæ (except in *E. caatinga*, where they spread horizontally, and merely droop at the points)—and for the long cylindrical pale-green entire leaf-sheaths, which finally fall away completely, along with the rest of the leaf, so that the stem always appears clean and naked up to the base of the lowest extant leaf. The straight rigid compressed spadices are closely beset with straight slender white branches, which only bend under the weight of the ripe fruits.

E. CAATINGA, *Wallace, Palms*, pl. 8.

Hab. in sylvis humilioribus arenosis "Caatingas" dictis totius fluminis Negro (*Wallace, l. c.*; *Spruce, hb. Palm*, 45).—"Açai-Catinga" Brasiliensium dicta est.

Caudex solitarius, e rhizomate conico radicibus strictis constanter supra terram plus minus emergente ortus, 30–50-pedalis, tenuis (diametro brachiali) erectus subflexuosus, annulis dissitis notatus.

Folia pauca contemporanea 10-pedalia, fere horizontaliter patula, ambitu longe lanceolata obtusa, concinne pinnata; *petiolus* vagina cylindracea bipedali albo-viridi carnosa constans; *rhachis* 8-pedalis, basi semi-

pollicem lata, supra canaliculata, subtus obtuse carinata, secus apicem tamen supra acute carinata subtus convexa, squamulis purpureis (rotundatis, quadratis, acuminatisve) ciliatis sparsa; pinnæ 45-jugæ, semiverticaliter insertæ, angulo 45°–50° patulæ, arcuatæ sed minime pendulæ (ut in *E. oleracea* videntur), elongato-lanceolatæ, apice acutæ et subcucullatæ, leviter 5-plicatæ, mediæ sesquipedales et longiores pollicem latæ, paucæ apicales 7-pollicares, basales tamen longiores $22 \times \frac{1}{4}$-pollicares cæteris angustiores et magis dissitæ.

Spadices solitarii infra folia oriundi ad angulum 40° porrecti rigidiusculi polystiche ramosi; *rhachis* 32-pollicaris (pedunculo brevissimo 2-pollicari incluso) tomento brevi albido (e pilis crassis fasciculatis) persistente vestita; *rami* sub 64 conferti squarrosi (infimi subdivergentes, medii rectanguli, superiores subadscendentes) e basi turgida attenuati, 16–21-pollicares; *alveoli* nec conferti nec profundi, triflori, florem ♀ cum fl. ♂ duobus ad ejusdem basin anteriorem positis amplectentes. Spathæ . . . . .

Flores bracteolati, ♂ . . . . . ; fl. ♀ *sepala* et *petala* oblato-orbicularia, illa apice rotundata, hæc paulo longiora subapiculata. *Ovarium* in flore non visum; *stigmata* 3 recurva, sub carpelli unici grossificatione tam excentrica ut ad ejus medium ventrem posita viderentur. *Baccæ* nigræ globosæ, diametro 3-lineari, siccando e mesocarpio tenui albido grumoso tuberculatæ; *endocarpium* tenue membranaceum intus raphes vasibus tenuibus reticulatum. *Semen* 3-lineare; *testa* valida nigrescens, raphe ligulata subramosa a basi ad medium ventrem percursa; *albumen* solidum corneum; *embryo* subbasilaris conicus obtusus, extremitate radiculari caviusculus umbilicatus.

Obs. In *E. oleracea*, Mart., secus fl. Negro ostia lecta (*S. hb. Palm.* 21) pinnas 78-jugas, $2\frac{1}{2}$-pedales, exacte pendulas, inveni; spadicum rhachin basi prælata amplexante superne sensim angustatam, compressam, supra convexam et ramos plurimos multifloros proferentem, subtus planam et ramis orbatam, corollam fl. ♀ albam; baccas diametro fere semipollicares, &c.

This very distinct species, the only one of the genus *Euterpe* which has horizontally spreading and not pendulous pinnæ, is widely distributed throughout the "Caa-tingas," or White Forests, of the Rio Negro. It varies so much in the quality of the fruit that, were not all essential characters the same, it might be supposed to include two or more species; for in certain districts the mesocarp of the fruit, though thin, is soft and sweet, and makes a better drink than even the common Assai or Manaca (*E. oleracea*); but where the palm grows on almost bare flats of granite rock that are inundated with every shower, the pulp is so grumous or gritty as to be unserviceable; and such is its character all about the mouth of the Casiquiari and the Venezuelan frontier, where I have chiefly seen this species.

The tubular sheath at the base of the outermost extant leaf includes and conceals all the inner sheaths. At its mouth it is usual to find a mass of soft flat deep-purple threads, $\frac{1}{40}$ of an inch broad, each traversed by a strong midrib; they are the remains of the membrane (a continuation of the petiole-sheath) that enveloped the whole frond in vernation, and has been torn to shreds by its expansion. The same shreds in the Piassaba palm, being far stronger and firmer, persist on the petiole-sheath, and hang down like a beard. There is scarcely any proper petiole besides the sheathing base, the rhachis being pinnate throughout.

Whether the "Assaí-caatinga" be distinct or not from the "Assaí-mirí" that grows towards the mouth of the Rio Negro, my specimens are insufficient to decide. The latter was sent to Kew, in 1851, under the MS. name of *Euterpe mollissima* (*Hb. Palm.* 5; *Kew Mus.* 90); but I never saw either flowers or fruits of it. I found it to have a slender *tapering* stem, 3 inches thick at the base, but only 1 inch at the apex, of very tender consistence, and exuding when wounded a quantity of limpid fluid, which hardened into a reddish gum. Leaves of the same length as *E. caatinga*, but having as many as 58 pairs of pinnæ instead of only 45 pairs.

ŒNOCARPUS.

A very natural group, although its limits still remain to be accurately ascertained. The species differ at sight from *Euterpe* in the long sheathing base of the petioles being purplish or leaden-coloured, fusiform, more than twice the diameter of the upper part of the stem, and split up in front, not whitish-green, cylindraceous and entire, like the leaf-sheaths of *Euterpe*. Another striking difference from *Euterpe* is in the broom-like spadix, with numerous long simple pendulous branches crowded on an excessively contracted rhachis. The sepals of the ♂ flowers are valvate and united below, while in *Euterpe* they are free and imbricated. The ♀ flowers have usually the same whitish hue, and the same structure, in both genera; and the plum-like pruinose fruits are very similar (only rather larger in *Œnocarpus*), and oblong, rarely globose (as they are in every species of *Euterpe*).

One character, assumed by Martius to be constant in the genus *Œnocarpus*, viz. "bacca . . . . . stigmatibus excentricis coronata," does not exist in *Œ. bacaba*, Mart., *Œ. minor*, Mart., and *Œ. multicaulis*, sp. n., which have the short connivent stigmas persistent at the geometrical apex of the ripe fruit. I have no note on the form of the fruit of *Œ. distichus* and *bataua*, but I suspect that these (and perhaps *Œ. circumtextus*) are the only species answering to Martius's generic character; for they are said to have obtuse berries, while in the three species first mentioned the berries are acute.

The larger species are among the noblest of Palms; and they require to be restudied in their native haunts; for there are probably several among them still undescribed, and it would seem that the same vernacular name is applied to very distinct species in different (or even in the same) localities. The *Œ. bataua*, Mart. Palm. 23, which is supposed to be the same as the "*Palma patavona*" of Aublet, is surely distinct from the palm that Mr. Wallace and myself have heard called "Patauá" by the Brazilians, "Seje" by the Venezuelans; for no mention is made in Martius's description of the trunk being encased in the spiniform remnants of the leaf-sheaths, and only becoming denuded in the tallest specimens, after the fashion of the Piassaba; on the contrary, it is classed among the species "caudice nudo."

I thought at one time that our palm might be the *Œ. circumtextus* (Mart. Palm. 26, t. 26), which is said to have the trunk "ubique tectus residuis petiolorum in opus fibrosum *reticulatum* dissolutis;" but in the Patauá the veins of the leaf-sheaths persist—not as reticulated fibres, but as *straight spines*, 1½–3 feet long, and stouter than knitting-needles; and they constitute the almost ready-made darts which the Indians shoot from the blowing-cane. Besides, *Œ. circumtextus* is altogether a smaller plant; for the trunk is only about 20 feet, and the leaves 8 to 10 feet long; even the leaves of *Œ. bataua* are said to be only 15 feet; whereas the Patauá is a giant among palms, the trunk reaching 80 to 100 feet, and the leaves nearly half that length. I find, however, that I have preserved only an estimate (not an exact measurement) of the leaves of the Patauá; but the pinnæ alone of my dried specimens are 5 feet 4 inches (English) long, by 4 inches wide, and they were so numerous on each frond that I did not take the trouble to count them, but merely indicated their number by the symbol for infinity; so that I do not hesitate to say that the entire leaves are 40 feet long, at the least.

All the species of *Œnocarpus* have the pinnæ numerously and strongly plicate; in the Patauá I have counted 14 or 15 folds on a single pinna. The ripe fruit is usually of a deep violet or black,

but in the Patauá of a greyish-purple colour. The thin mesocarp, when triturated with water, affords a creamy sweetish liquor, which is more used as a drink in the northern parts of Venezuela than the similar but more highly coloured liquor obtained from the fruits of the Euterpes.

1. Œ. MINOR, *Mart. Palm.* 25, t. 27: caudice solitario 15–30-pedali gracillimo nudo; foliis æqualiter pinnatis, pinnis sub-60-jugis bipedalibus lineari-lanceolatis abrupte acuminatis 5-plicatis subtus albidis et albido-puberulis; spadicum axi brevissima (2-pollicari v. vix longiore), ramis plurimis 15-pollicaribus confertis pendulis; baccis sub-7-linearibus ellipsoideis stylo brevissimo apicali rostellatis.

Hab. "in sylvis provinciarum Paraënsium et Rio Negro" (*Mart. l. c.*): in sylvis elatioribus siccioribus fluminis Negro supra ejus ostia; mense Martio fructus suos maturat; *Bacaba-í* Brasiliensium (*S. hb. Palm.* 3, 57).

Caudices solitarii mediocres, 15–30 pedes alti, diametro 1½–3-pollicari, validi denudati rufescentes.

Folia plurima contemporanea, polysticha, arcuato-horizontalia, æqualiter pinnata, 8½-pedalia (vagina petiolari bipedali crassa fusiformi antice fissa inclusa); *petiolus* proprius 7-pollicaris et *rhachis* compressa squamulis angustis fimbriatis rufis dense obsessa; *pinnæ* sub 60-jugæ (57–62) bipedales, angulo fere recto patulæ, longe lineari-lanceolatæ abrupte attenuato-acuminatæ, valide 5-plicatæ, supra saturate virides, subtus albidæ et sparse albido-puberulæ.

Spadices infra folia oriundi, simpliciter ramosi scopæformes; *axis* brevissima elongate conica, pedunculo 1¼-pollicari basi dilatata amplexante et rhachi pollicari constante; *rami* 24–41, 15 pollices longi, fastigiati penduli alveolati fructu corallini; *alveoli* 3-flori, nempe fl. ♀ unico inferiore bracteolato, fl. 2 superioribus ♂; sed in ramorum tertia superiore flores ♂ soli adsunt. *Spathæ* . . . . .

Flores ♀: *sepala* reniformia late imbricata. *Petala* (fructu maturato) sepalis duplo et ultra longiora, imbricata coriacea concava cordato-orbicularia, acumine brevi obliquo obtuso 2–3-fido terminata. *Baccæ* nigræ nitidæ, 7½ × 5-lineares, ellipsoideæ, symmetricæ, stylo brevissimo stigmatibusque 3 brevibus crassis triangularibus conniventibus rostellatæ, monospermæ; *mesocarpium* proprium tenue grumoso-carnosum; *endocarpium* (?) laminis plurimis flabellato-venosis constans; *testa* tenuis firma raphes vasibus tenuibus pallidis subanastomosantibus a basi ad apicem usque radiantibus percursa; *albumen* albescens lignescens, fibris tenuibus elongatis utrinque acutis horizontalibus constans; *embryo* hilo proximus.

Obs.—The fusiform leaf-sheaths are more than double the diameter of the stem; they open in front with a single slit, and then split up into fibres, similar to those of the Patauá, but much shorter and softer, and soon fall away altogether.

2. Œ. MULTICAULIS, sp. n.: caudicibus 6–10-nis, 15–30-pedalibus, validiusculis nudis; foliorum pinnis 60-jugis 2–3-natim aggregatis subtripedalibus lineari-lanceolatis acutis 8–10-plicatis, subtus glaucis et albido-puberulis; spadicum axi 7-pollicari, ramis plurimis pendulis; baccis pollicaribus ellipsoideis vel subovoideis stylo apicali rostellatis.

Hab. Andes Maynenses, alt. 1200′–4000′, præcipue secus villam Tarapoto, in humidis sylvarum primævarum, etiam in hortis ubique pro frondibus tectoriis cultus; *Sinámi* et *Siámba* Peruvianis dictus est (*S. hb. Palm.* 63).

Palma cæspitosa; *caudices* 6–10 ex eodem rhizomate orti, 15–30-pedales, graciles, diametro 4–5-pollicari, frondium basibus cito deciduis denudati, annulis latis spatio 8-pollicari dissitis notati.

Folia 10-pedalia et longiora polysticha arcuata pinnata, ambitu latolanceolata obtusata; *vagina* petiolaris 2½-pedalis ventricosa olivacea v. plumbea, mox antice rimosa et supra medium in fibros intertextos soluta (ad *Œ. batauæ* instar); *petiolus* proprius 8-pollicaris, et *rhachis* decidue ferrugineo-lepidota, a basi ad folii tertiam partem canaliculata, aciebus superne sensim approximatis demum confluentibus, dein ad apicem usque trigona, facie inferiore convexa, lateralibus planis, striata; *pinnæ* 60-jugæ inferiores apicalesque æquidistantes, mediæ 2–3-natim aggregatæ, angulum 75° cum rhachi efficientes, arcuatæ, subtripedales, tres fere pollices latæ, longe lineari-lanceolatæ acutæ, demum apice fissæ, 8–10-plicatæ, supra saturate virides nitidæ, subtus glaucæ et pube minuta albida sparsæ.

Spadices infra frondes oriundi, spatio 1–3 annulorum dissiti, breves, scopæformes; *pedunculus* 3-pollicaris subcompressus; *rhachis* 4-pollicaris; *rami* plurimi confertissimi sesquipedales penduli, tomento rufo deciduo vestiti, alveolati. *Spathæ* 2 lignescentes tomentosæ mox calvæ, deciduæ; exterior 10-pollicaris cuneata anceps (semiteres, aciebus alatis), antice ab apice ad medium bifida; interior subbipedalis elongato-fusiformis, superne paulo dilatata, ex apice obtuso rostrata, demum antice fissa rimosa.

Flores sessiles, in quoque alveolo 3, sc. medius ♀, laterales altius inserti ♂, floribus tamen ad rhachium tertiam supremam omnibus ♂. *Bracteolæ* florum ♂ 0, floris ♀ 3 ad alveoli parietes arcte applicitæ, extima canaliculata (semitubularis), interiores multo minores, media late triangularis, intima late subulata obtusa. *Flores* ♂ ochroleuci; *calyx* fere ad basin usque in lacinias 3 ovato-triangulares margine membranaceas (ante florationem valvatas) fissus; *petala* triplo longiora (sesquilinearia) ovali-lanceolata crassa valvata; *stamina* petalis paulo breviora receptaculo carnoso insidentia libera, *antheræ* lineares sagittatæ medio dorso adfixæ; *ovarii* rudimentum conicum apice trifi-

dum.—*Fl.* ♀ albescentes; *sepala* et *petala* cartilaginea orbicularia convoluto-imbricata, illa oblata, hæc demum aucta sepalis duplo longiora fructum stipantia; *stamina* 0; *ovarium* ovale 3-loculare (loculis 2 minimis cito absorptis) ovulo loculi fertilis unico erecto; *stigmata* tria terminalia sessilia, primum conniventia, ulterius reflexa. *Baccæ* nigro-purpureæ, 1×$\frac{3}{4}$-pollicares, ellipsoideæ vel subovoideæ, styli basi submucronatæ; *mesocarpium* tenue subdulce, lamina intima fibris plurimis contiguis complanatis a fructus basi ad apicem radiantibus constante; *semen* oblongum acutum; *testa* . . . . .; *albumen* æquabile fibroso-osseum; *embryo* hilo proximus.

BACTRIS, *Jacq.*

With *Bactris* we enter the COCOINEÆ, whose essential character is to have a symmetrical endocarp, that includes or combines all the three carpels, and is marked towards one end with three small circular depressions, or foveolæ, whereof usually only one, namely that opposite the embryo of the only fertile ovule and carpel, is open, the other two being closed (foramina cæca).

The Prickly Cocoineæ, with *Bactris* for their type, form a well-marked subtribe, distinguished not only by their prickles, but also by their floral envelopes being either gamophyllous or valvate, and the endocarp foraminate or foveolate at the apex*; whereas in the Unarmed Cocoineæ the sepals and petals of the female flowers are widely imbricated, and the endocarp is foraminate at the base.

Bactris differs from most of its near allies by the female flowers being entirely destitute of a sterile andrœceum. *Desmoncus*, Mart., comes the nearest to it: for an exposition of their differences see under that genus. *Guilielmia*, Mart., can hardly be considered even a subgenus, notwithstanding its attaining a far larger size than most species of *Bactris*; but even in size it is approached by such true *Bactrides* as *B. maraja*, Mart., and *B. balanophora*, sp. n.; and I fail to see how it differs in character from the section I have called below "Cyathochlamys."

Although so widely diverse in character from *Geonoma*, some of the smaller species of *Bactris* resemble certain Geonomas so closely in habit, and in the simple or pinnatisect forked leaves, and the apparent absence of prickles, that they are often classed along with them by the natives under the name of "Ubím-rána." Generally they may be distinguished by the ciliated leaves; but in some species the cilia exist only as a pencil at the leaf-points, although this pencil (at least) is never wanting to any *Bactris*, and exists in no *Geonoma*. Then the spathes are much firmer, and persist after the fruit; the inner spathe exceeds in length the entire spadix, and either overarches it or stands out above it at a sharp angle; whereas in *Geonoma* the spathes rarely exceed the peduncle alone, and from their more fragile nature they usually break up and fall away as the flowers open, so that often not even a fragment of them remains when the fruit is ripe.

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* Except only in *Acrocomia*, Mart., which has the petals of the ♂ flowers imbricated, and the endocarp foraminate at about midway.

A notable feature of *Bactris* is the peduncle of the spadix bursting through about the middle of the leaf-sheath, and there so sharply decurved that the spadix, even when only in flower› is either pendulous or at least horizontal.

The striæ of the thin leaf-sheaths are repeated on the epicarp of the drupes; and the endocarp is beset with ascending pointed processes, which penetrate the pulpy mesocarp and, on examination, are found to be true prickles, springing from the veins of the endocarp, precisely like those of the leaves and leaf-sheaths. The drupes of nearly every species are tipped with a short rostellum (the persistent style) which is more or less trigonous, and often tubular.

In the forests of the Amazon, the *Bactrides* are almost as numerous as the Geonomas, and, along with them, form no inconsiderable portion of the undergrowth. They are found in all kinds of situations, wet and dry, but prefer recent forests to primitive. The young woods that speedily clothe deserted clearings are particularly liable to get infested with prickly and bristly plants, among which predominate *Bactrides*, *Astrocaryæ*, *Mimosæ*, *Scleriæ* (Cut-grasses), and even sometimes prickly Tree Ferns (*Alsophila infesta*, e. g.), and combine into almost impenetrable thickets.

CONSPECTUS SPECIERUM INFRA DESCRIPTARUM.

§ 1. *Isochlamys.*

Florum fœmineorum calyx et corolla subæquilonga, pergaminea vel subcoriacea, glabra, ovoideo-urceolata ore tridentata, fructu persistentia plus minus patula, trifida partitave. *Palmæ humiles tenues plerumque inermes microcarpæ. Folia simplicia bifurca, rarissime pinnatisecta. Spadices simplices. Spathæ semper inermes.*

1. B. BREVIFOLIA, *sp. n.* Palma inermis vel ad foliorum vaginas de-

cidue aculeolata; caudice diametro 3-lineari; foliorum petiolo 6-pollicari, alis furcisve 7½-pollicaribus late rhomboideo-lanceolatis subfalcatis, venis utrinque 11–12 bis flexis directione media ad angulum 36°–38°; drupis globosis rostellatis.

2. B. NEGRENSIS, sp. n. Palma omnino inermis; caudice diametro 3-lineari; foliorum petiolo 9-pollicari, alis subpedalibus rhomboideo-ligularibus apice subfalcatis, venis utrinque 7–8 angulo 37° subrectis; drupis ovoideis.

3. B. SIMPLICIFRONS, *Mart.*? Palma fere omnino inermis; foliis simplicibus vel vario modo pinnatisectis, laciniis 12–16-pollicaribus, venis utrinque 16–20 angulum peracutum (15°–18°) cum rhachi efformantibus; drupis (teste Martio) magn. pisi globosis.

4. B. CAROLENSIS, sp. n. Palma ad foliorum petiolos et vaginas aculeis armata; caudice diametro 5-lineari; foliorum petiolo pedali, alis 9-pollicaribus rhomboideo-lanceolatis vix falcatis, venis utrinque 8 ad angulum 30° directis; drupis globoso-turbinatis.

§ 2. *Anisochlamys.*

Fl. ♀ calyx corolla dimidio et ultra brevior tenuis tripartitus. Corolla coriacea ovoideo-urceolata triloba, demum aucta subpatula et magis profunde fissa. *Palmæ humiles tenues, inermes vel subarmatæ. Folia sæpius interrupte pinnata, pinnis paucis. Spadices simplices. Spathæ inermes.*

5. B. TENUIS, *Wallace.* Palma ad petiolos vaginasque aculeata; foliis 16-pollicaribus (rhachi 5-pollicari) pinnatis, pinnis 4-jugis inæquidistantibus 8-pollicaribus lineari-lanceolatis longe falcato-acuminatis; drupis globosis.

6. B. UAUPENSIS, sp. n. Palma inermis; foliis fere bipedalibus, pinnis 9-jugis 6 pollices longis lineari-lanceolatis acuminatis valde falcato-incurvis; drupis……

§ 3. *Cyathochlamys.*

Fl. ♀ calyx brevissimus annularis, ore trigonus trifidusve, sæpe membranaceus. Corolla calyce multo longior cupularis truncata coriacea vel etiam lignea, extus lanata villosave, fructu aucta integra ve, sæpius ore irregulariter fissa. *Palmæ humiles vel mediocres aculeis armatæ. Folia pinnata, pinnis aggregatis* (B. bifidæ *simplicia*). *Spadices ramosi* (B. bifidæ *simplices*). *Spatha interior armata.*

* Folia spadicesque simplicissima.

7. B. BIFIDA, *Mart.* Palma subhumilis aculeata; foliorum lamina 3-pedali bifurca basi longissime cuneata, venis acutissimis ad angulum

8° directis valide plicatis; drupis magnitudine pruni damasceni subobovatis succulentis glabris.

** Folia interrupte pinnata.

8. B. FLOCCOSA, sp. n. Palma tenuis aculeata, ad petiolos præcipue albido-floccosa; foliis $2\frac{1}{2}$-pedalibus, pinnis sub-10-jugis, inferioribus 2–4-natim aggregatis, superioribus subæquidistantibus 7–9-pollicaribus lineari-obovato-lanceolatis tenuiacuminatis supra subtusque ad venas minute strigillosis, margine setis albidis ciliatis; spadicibus ramos 4–7 proferentibus pendulis; drupis pisum minus æquantibus globosis vel subobovatis glabris.

9. B. BIDENTULA, sp. n. Palma aculeis validis armata; caudice diametro 1–$1\frac{1}{2}$-pollicari; foliis $4\frac{1}{2}$-pedalibus, pinnis 33-jugis, inferioribus 3–4-natim, superioribus 6–8-natim aggregatis 15 pollices longis lineari-obovatis, subtus albido-cinereis, apice recto elongato-triangulari bidentulo, margine aculeis utrinque 6–7 ciliatis; spadicibus 9-pollicaribus e ramis plurimis fastigiatis scopæformibus; drupis globosis succulentis glabris magn. globuli sclopetarii minoris.

10. B. BICUSPIDATA, sp. n. Priori affinis, pinnis tamen paucioribus majoribus apice profundius bifidis, aculeolis marginalibus utrinque sub 20.

11. B. TURBINATA, sp. n. Palma aculeata; caudice diametro semipollicari; foliis 3-pedalibus, pinnis 9–10-jugis 2–3-natim aggregatis 10 pollices longis, lineari-lanceolatis, acumine subfalcato, setoso-ciliatis; spadicibus 5-pollicaribus ramos 2 solos horizontales proferentibus; drupis $3\frac{1}{2}$ lineas longis oblongo-turbinatis subpilosis.

12. B. HYLOPHILA, sp. n. Palma aculeata; caudice diametro semipollicari; foliis 3-pedalibus, pinnis 15-jugis fere æquidistantibus sub-10-pollicaribus lineari-lanceolatis, acumine subfalcato, subtus ad venulas pilosulis, margine setoso-ciliatis; spadicibus decurvis vix semipedalibus ramos 2 proferentibus; drupis obovato-globosis magn. grani piperis supra medium pilosis.

13. B. MICROCARPA, sp. n. Palma aculeata; caudice diametro 4-lineari; foliis 3-pedalibus, pinnis 22-jugis, 4–6-natim aggregatis lineari-lanceolatis, acumine subulato, supra subtusque ad venulas pilosulis, margine setoso-ciliatis; spadicibus $3\frac{1}{2}$-pollicaribus, ramis 3–4 horizontalibus; drupis pro planta minutis, diametro 2 lineas, globosis, pilosis.

14. B. BALANOPHORA, sp. n. Palma mediocris aculeis horridissima; caudice diametro sesquipollicari; foliis $4\frac{1}{2}$-pedalibus, pinnis 28-jugis 3–4-natim aggregatis 20-pollicaribus lineari-lanceolatis sensim tenuiacuminatis, subtus ad venulas pilosis, margine aculeato-ciliatis; spadicibus 7–9-pollicaribus decurvo-pendulis scopæformibus, ramis 12–

13 villoso-incanis; drupis semipollicaribus ovatis superne attenuatis corollæ persistentis cupularis ligneæ basi receptis glabris.

§ 4. *Endochlamys.*

Fl. ♀ calyx corolla longior globoso-urceolaris; corolla eidem inclusa platystoma extus lanata. *Palmæ subhumiles aculeatæ. Folia æqualiter pinnata. Spadices simplices. Spatha interior armata.*

15. B. CONCINNA, *Mart.* Palma aculeis prælongis nonnullis 3-pollicaribus armata; caudice diametro 9-lineari; foliis 5-pedalibus, pinnis 28-jugis 16-pollicaribus linearibus sensim tenuiacuminatis setoso-ciliatis; spadicibus 9–12-pollicaribus simplicibus decurvo-pendulis; drupis magn. pruni damasceni oblongis glabris.

Sequuntur descriptiones ampliores:—

1. B. BREVIFOLIA, sp. n.

Hab. in sylvis siccioribus fl. Negro ad S. Gabriel (*Spruce, hb. Palm.* 35): etiam locis similibus fl. Uaupés (*S. hb. Palm.* 80).

Caudex 3–5-pedalis, diametro 3-lineari, inermis.

Folia sub 10 coætanea simplicia bifurca; *petiolus* 6-pollicaris (vagina $3\frac{1}{2}$-pollicari pluristriata ore in ligulam 4 lineas longam truncatam setoso-ciliatam producta inclusa), inermis vel aculeolis perpaucis cito caducis ad vaginam armatus; *rhachis* 4-pollicaris; *alæ* $7\frac{1}{2} \times 3\frac{1}{4}$-pollicares late rhomboideo-lanceolatæ subfalcatæ vix acuminatæ, secus apicem aculeolis nigris appressis ciliatæ penicillatæque; *venæ* utrinque 11–12-næ bis flexæ directione media angulo 36°–38°.

Spadices simplices fere bipollicares; *pedunculus* pollicaris e vaginæ latere erumpens ibidemque abrupte decurvus; *rhachis* vix pollicaris. *Spathæ* . . . . . .

Flores ♀: *calyx* et *corolla* (fructus maturi) æquilonga, subcoriacea, patula, tripartita, laciniis late ovatis apiculatis. *Drupæ* globosæ, diametro 3-lineari, longiuscule rostellatæ, coccineæ (demum nigræ ?)

2. B. NEGRENSIS, sp. n.

Hab. in sylvis secus fl. Negro ostia (*Spruce, hb. Palm.* 17).

Rhizoma tuberiforme radices prælongas horizontales ramosas proferens. *Caudex* 3-pedalis, diametro 3-lineari, distanter annulosus, inermis.

Folia sub 5 contemporanea simplicia bifurca; *petiolus* 9-pollicaris pluristriatus minute leproso-puberulus, vagina ocreave antice in ligulam ovatam, vaginam suprajacentem imbricantem, producta; *lamina* bifurca, alis 13×2-pollicaribus lineari- vel ligulari-rhomboideis apice subfalcatis vix acuminatis, margine obsolete setulosis, apice tamen setis nigrescentibus 2 lineas longis penicillatis; *venæ* primariæ utrinque 7–8-næ angulo 37° e costa egredientes subrectæ.

Spadix simplex e folii infimi axilla ortus 1½–2-pollicaris decurvo-pendulus. *Spathæ* inermes; *exterior* brevior dorso bicarinata; *interior* bipollicaris et ultra fusiformis apiculata coriacea badia.

Flores ♂ jam delapsos non vidi. *Flores* ♀: *calyx* et *corolla* fructus basin stipantes subæquilongæ patulo-cupulares ad medium usque in lobos 3–4 late ovatos abrupte apiculatos fissæ, pluricostatæ, virides subcoriaceæ margine membranaceo nigrescentes. *Drupæ* (immaturæ) 3 lineas longæ ovoideæ apice attenuatæ.

Var. MINOR.

Hab. in sylvis fl. Tarumá flum. Negro defluentis.

Cum forma typica convenit, *folia* tamen minora alis 10-pollicaribus. *Flores* ♀ juniores adsunt, parvi flavidi: *calyx* ovoideo-urceolatus subcoriaceus striatus, ore oblique 3-dentato vel breviter 3-lobo, sinibus excavatis. *Corolla* forma simili subbrevior, ore obliquo 3-lobo subciliato. *Ovarium* ovato-lagæniforme; *stigmata* in massam pyramidatam coalita.

3. B. SIMPLICIFRONS, *Mart.* ? *Palm.* 103, t. 73 c. f. 1, 2.

Hab. in silvis ad Tauaú prope Pará.

Formæ tres mihi adsunt, fructibus carentes:

A: *folia* simplicia; *petiolus* pedalis lepra ferruginea obtectus; *lamina* 16-pollicaris (secus costam mensa) cuneata bifurca subacuminata, margine setuloso ciliata, setulis nigris majoribus semilinearibus cum brevioribus mixtis, apicalibus longioribus penicillatis; *venæ* utrinque 20-næ angulo peracuto (15°–18°) egredientes, fere omnino rectæ, inferiores 14 pollices longæ, superiores breviores.

B: *folia* pinnatisecta; *petiolus* pedalis basi ocrea integra ferrugineotomentella setis aculeolisque subappressis sparsa caudicem amplectens; *lamina* 12-pollicaris, pinnis altero latere duabus, altero latere quatuor (duabus intermediis perangustis); *venæ* 16-næ angulo longitudineque ut in forma A.

C: *folia* pinnatisecta; *petiolus* 10-pollicaris basi ocreatus ut in priore; *lamina* 12½-pollicaris, pinnis utrinque 8-nis gramineis sensim tenuiacuminatis, infimis pedalibus.

My specimens of this palm being incomplete, I refer them doubtfully to *B. simplicifrons.* They agree with Martius's character in the "foliis simplicibus ...... tandem pinnatifissis," although the latter peculiarity renders the name "simplicifrons" less appropriate to them than to either of the preceding species, whose leaves are constantly and truly simple. The locality assigned by Martius is also the same as mine, namely, "near Pará," where this palm grows not uncommonly along with the "Ubím" (*Geonoma baculifera*), and, from its resemblance to it, is classed along with the "Ubím-rana," or False Ubím, which are chiefly Geonomas with pinnatisect leaves.

4. B. CAROLENSIS, sp. n.

Hab. in sylvis recentioribus fl. Negro superioris prope pagum San Carlos (*S. hb Palm.* 52).

Caudices 1–3 ex eodem rhizomate orti, 3–4-pedales crassitie digiti (5-lineari) vaginis persistentibus plus minus obvelati. *Aculei* caudicis subnulli, sat numerosi ad petiolos infra medium et præcipue ad vaginas, 3 lineas longi, tenues, nigri, squarrosi, solitarii, rarius terni, sæpe basi ramulosi.

Folia simplicia bifurca; *petiolus* (vagina $3\frac{1}{2}$-pollicari inclusa) fere pedalis, junior tomento arachnoideo obsessus serius calvus, aculeatus; *laminæ* alis tenuibus $9\times2\frac{1}{2}$-pollicaribus lanceolato-rhomboideis, apice vix falcato subacuminato, *venis* primariis utrinque sub-8-nis ad angulum 30° directis.

Spadices simplices e vaginis aphyllis orti; *pedunculus* sesquipollicaris apicem versus abrupte reflexus; *rhachis* sesquipollicaris horizontalis vel leviter deflexa glabra. *Spatha* interior spadicem excedens anguste fusiformis subcuspidata inermis.

Flores ♀ virides parvi fructu persistentes auctique. Calyx ovoideus striatus ad medium usque in lobos 3 ovatos truncatos badio-marginatos fissus. *Corolla* calyci æquilonga ovoideo-urceolata, ore constricto inæqualiter 3-dentata, serius 3-loba una cum calyce patula. *Drupæ* diametro $2\frac{1}{2}$ lineas, globoso-turbinatæ rostellatæ.

5. B. TENUIS, *Wallace, Palms of Amaz.* pl. 33.

Hab. in sylvis fl. Uaupés (*Spruce, hb. Palm.* 78) et fl. Negro superioris (*Wallace, l. c.*). Palma "Peuririma" Amazoniensium videreter (*conf. Bates,* 'Naturalist &c.' i. 292).

Caudex 6–10-pedalis tenuis, diametro 3-lineari, rectus vel inclinatus, vaginis marcescentibus aculeatis superne velatus, cæterum inermis.

Folia pinnata; *petiolus* 11-pollicaris basi longe vaginatus, ligula vaginæ cito dissoluta, inferne et ad vaginam sparse aculeatus, aculeis nigris tenuibus debilibus vix 3-linearibus; *rhachis* inermis; *pinnæ* 4-jugæ inæquidistantes, lineari-lanceolatæ, longe falcato-acuminatæ, unicostato-plicatæ, terminalibus solis 3-plicatis, mediæ $8–9\times\frac{3}{4}$-pollicares, infimæ fere dimidio breviores, omnes apice solo paucis setulis obsessæ cæterum glaberrimæ.

Spadicis simplicis e vaginis aphyllis oriundi *pedunculus* sesquipollicaris medio abrupte decurvus; *rhachis* sesquipollicaris pendula dense florifera glabra. *Spatha* interior tenuifusiformis spadicem superans.

Flores ♀: *calyx* et *corolla* fructum maturum stipantes patulæ trilobæ, hæc subduplo longior. *Drupæ* diametro trilineares globosæ subapiculatæ; *epicarpium* pergamineum obscure striatum; *mesocarpium* tenue carnosum; *endocarpium* tenue lignosum nigrum vertice 3-foveolatum, extus setis nigris mesocarpium penetrantibus obsessum.

6. B. UAUPENSIS, sp. n.

Hab. ad fluvium Uaupés in sylvis inundatis (*S. hb. Palm.* 77).

Caudex 6-pedalis, diametro 3–4 lineas, virescens distanter annulatus inermis.

Folia interrupte pinnata inermia; *petiolus* 11-pollicaris (vagina 5-unciali striata ore in ligulam membranaceam producta inclusa); *lamina* 10-pollicaris; *pinnæ* 9-jugæ, inferiores invicem dissitæ et aggregatæ (formula 1, 2, 6 cujusque lateris) 6 pollices longæ, 9 lineas latæ, patulæ, dein apice valde falcato-incurvæ, lineari-lanceolatæ acuminatæ, 1-plicatæ, terminalibus tamen 2–3-plicatis, secus apicem sparse setuloso-ciliatæ.

Spadicum simplicium *pedunculus* sesquipollicaris, medium versus abrupte decurvus; *rhachis* pollicaris pendula glabra densiflora. *Alveoli* minime profundi triflori, 2 floribus superioribus masculis præcocioribus cito caducis nonnunquam obsoletis, flore inferiore ♀. *Spatha* interior fere 3-pollicaris spadicem superans anguste fusiformis junior fulvo-leprosa.

Flores ♀ virescentes gibbi; *calyx* corolla dimidio et ultra brevior membranaceus cupularis nigro-marginatus tripartitus, laciniis inæqualibus late triangularibus acuminatis carinatis, carinis incrassatis. *Corolla* coriacea oblique ovoidea ore inæqualiter 3-loba. *Ovarium* ovatum; *stigmata* in massam conicam coalita.

7. B. BIFIDA, *Mart. Palm.* 105, t. 73 C. f. 3.

Hab. in sylvis humilioribus subripariis fl. Negro secus ejus ostia (*Spruce, hb. Palm.* 22). In iisdem locis primus legit cel. Martius. Palma *Bússu-ràna* ab incolis nuncupata.

Caudex 10×1-pedalis plerumque inclinatus, nodis dissitis, internodiis aculeis deciduis armatis.

Folia plurima contemporanea, simplicia; *petiolus*...... aculeatissimus; *lamina* 3×1-pedalis cuneato-lanceolata bifurca, furcis subobtusis, ad venas acutissimas (angulo 8°) valide plicata subtusque tomentella; cæterum facie inferiore albescentia siccando nitore metallico cupreo chalybeoque splendentia, margine setoso-ciliata, rhachi parce aculeata sed dense rufo-leprosa. *Aculei* longitudine varia, longiores 3-pollicares trigoni acutissimi, decidue tomentelli.

Spadices simplices, pedunculo rufo setulis appressis sparso. *Spathæ* lanceolato-fusiformes, interior aculeolata.

Flores ♀: *calyx* (fructus) annularis; *corolla* multo longior cupularis, ore leviter fissa, extus pubescens. *Drupæ* subobovatæ rostellatæ sub apice limbo elevato circumcinctæ, e viridi saturate purpureæ (nunquam nec maturæ nigræ), mesocarpio succulento acido-dulci.

The simple leaves imitate on a small scale those of *Manicaria* *saccifera*, Gaertn., which is the "Bussu" of the dwellers on the Amazon, whence this *Bactris* is commonly called "Bussu-rana" or False Bussu.

8. B. FLOCCOSA, sp. n.

Hab. in sylvis flum. Amazonum prope Santarem (*S. hb. Palm.* 37).

Caudex 4-pedalis tenuis aculeatus.

Folia 2½-pedalia interrupte pinnata; *petiolus* tenuis albido-floccosus aculeis subsquarrosis tenuibus nigro-badiis, longioribus semuncialibus, usque ad rhachis apicem ipsum armatus; *pinnæ* sub-10-jugæ, inferiores 2–4-natim aggregatæ, superiores subæquidistantes, 7–9 pollices longæ, circiter 9 lineas latæ, lineari-obovato-lanceolatæ, acumine abrupto tenui, supra subtusque ad venas minute strigillosæ, margine setis albidis ciliatæ.

Spadices ex axillis aphyllis orti, breves, penduli, dense badio-villosi, ramis 4–7 fastigiatis.

Flores...... *Drupæ*=pisum minus, coccineæ, globosæ vel subobovatæ rostellatæ.

9. B. BIDENTULA, sp. n.

Hab. in fl. Negro ripis prope urbem Manaos (*S. hb. Palm.* 9).

Caudices 3–4 ex eodem rhizomate orti, 10–15-pedales, diametro 1–1½-pollicari, internodiis semipedalibus dimidio superiore aculeatis.

Folia 4½-pedalia interrupte pinnata; *petiolus* basi crassissimus, crebre aculeatus, vagina demum antice reticulato-dissoluta; *pinnæ* 33-jugæ, inferiores 3–4-natim, superiores 6–8-natim aggregatæ, 15×1¼-pollicares, lineari-obovatæ vel potius elongato-cuneatæ, apice 2½-pollicari acute triangulari inæqualiter bidentulo, dente superiore longiore vix semipollicari sæpe aristiformi, pluricostulatæ et tribus circiter venis plicisque primariis percursæ, subtus leproso-cinereæ albidæve, margine cartilagineo primitus floccoso aculeolis longis paucis (utrinque 6–7) ciliato. *Aculei* petioli sæpe 3–7-nati semi- ad sesquipollicares compressi nigri.

Spadices spatha interiore breviores e ramis plurimis tenuibus polystichis fastigiatis scopæformes. *Spatha* exterior 10-pollicaris inermis; interior 16-pollicaris, fusiformis, demum antice fissa, fornicata, furfuracea, aculeolis tenuibus nigris dense obsessa.

Flores ♀: *calyx* minutus annularis obscure trigonus. *Corolla* multo longior cupularis, fructu maturato in discum orbicularem explanata. *Baccæ* nigro-purpureæ globosæ, apice depresso rostellato, magnitudine globuli sclopetarii minoris; *mesocarpium* gossypioideo-pulposum succulentum et ante maturitatem intense acidum; *endocarpium* extus processibus aculeisve obsessum.

Ab hac et sequente differt *B. campestris* (Pöpp. in Mart. Palm.) pinnis margine lævissimis, supra subtusque concoloribus etc., etiamsi apice bifidis ut in nostra et in *B. chloracantha* (Pöpp. *l. c.*).

Hæc ultima folia habet solum 2–3-pedalia subtus concoloria et drupas ovatas nec globosas.

10. B. BICUSPIDATA, sp. n.

Hab. in sylvis fluvii Acará prope Pará (*S. hb. Palm.* 81, specimina incompleta).

Caudex arundinaceus subaculeatus.

Folia interrupte pinnata majuscula; *pinnæ* 21-jugæ, 2–3-natim aggregatæ, mediæ fere sesquipedales, 1–1½ pollices latæ, lineari-lanceolatæ, apice subfalcato bifido, lacinia altera brevissima, altera fere bipollicari subulata, subtus lepra pubeve brevissima albida sparsæ, margine aculeolis utrinque 20 ciliato; *venæ* primariæ cujusque pinnæ unicæ (terminalium ternæ), secundariæ suboctonæ subtus prominulæ. Folia siccando transverse corrugata.

11. B. TURBINATA, sp. n.

Hab. in sylvis humidis fl. Negro superioris secus San Carlos (*Spruce, hb. Palm.* 51).

Caudices 9-pedales tenues, diametro semipollicari, erecti flexuosive, decidue aculeati.

Folia interrupte pinnata 3-pedalia; *petiolus* 20-pollicaris, squamulis rufis dense leprosus, inferne aculeis horridus superne inermis, rhachi tamen secus apicem setulis strigosa; *pinnæ* 9–10-jugæ, 2–3-natim aggregatæ, 10 pollices longæ, 7–9 lineas latæ, lineari-lanceolatæ, supra medium paulo latiores, subfalcato-acuminatæ, basi constricta reduplicatæ, setoso-ciliatæ, vena media subtus setulosa. *Aculei* nigri tenues, sæpe deflexi, longiores pollicares.

Spadices e vaginis aphyllis orti; *pedunculus* 3-pollicaris, supra medium reflexo-horizontalis, aculeolis tenuibus pilis griseis mixtis dense villosus, apice bifidus, ramis bipollicaribus. *Spathæ*......

Flores ♀: *calyx* minutus albido-membranaceus trifidus, laciniis cuspidatis. *Corolla* coriacea, extus lanata, cupularis, demum inæqualiter tri- vel plurifissa. *Drupæ* 3½ lineas longæ, 2½ lineas latæ, oblongo-turbinatæ apice depresso rostellatæ, striatulæ, sparse pilosæ.

12. B. HYLOPHILA, sp. n.

Hab. ad rivulos sylvarum fl. Negro secus ejus ostia (*Spruce, hb. Palm.* 15).

Caudex 10–15-pedalis tenuis, diametro semipollicari, erectus nutansve, aculeatus, superne reliquiis vaginarum spadicumque vetustorum obtectus.

Folia 3-pedalia subæqualiter pinnata; *petiolus* præcipue ad vaginam aculeatus et inter aculeos molliter pilosus, aculeis nigris tenuibus compressis 3–9 lineas longis; *pinnæ* 15-jugæ, inferiores 10–11-pollicares, 6–8 lineas latæ, superiores multo breviores, lineari-lanceolatæ subfalcato-acuminatæ, tenues, supra glabræ vel vix subpilosæ, subtus ad venas marginesque pilis fulvis sparsæ.

Spadices fere semipedales, decurvi, bifidi, ramis inæquilongis; *pedun-*

culus rhachesque setis nigrescentibus cum pilis flexuosis mixtis obsessæ. *Spatha* exterior inermis bialata; interior fusiformis, spadice longior, ferrugineo-leprosa et setis nigris mollibus subappressis obsessa.

Flores ♀: *calyx* minutus papyraceus 3-lobus. *Corolla* coriacea cupularis primum integra, fructu maturo ore multifida, extus pilis flexuosis lanata. *Drupæ* obovato-globosæ, rostratæ, magn. grani piperis, coccineæ (demum nigræ?) supra medium pilosæ; *mesocarpium* tenuissimum.

13. B. MICROCARPA, sp. n.

Hab. in sylvis recentioribus fl. Negro, præcipue ad cataractas Sancti Gabrielis dictas, frequens (*S. hb. Palm.* 31).

Caudex 4–6-pedalis, diametro 4-lineari, erectus nutansve, fragilis, internodiis 1½–2-pollicaribus decidue setosis, superne vaginis persistentibus crebre aculeatis velatus.

Folia pauca (sub 4) coætanea, interrupte pinnata, sub-3-pedalia, ambitu ovato-oblonga; *petiolus* sesquipedalis superne inermis ad basin vaginamque aculeatus, ferrugineo-leprosus et ad rhachin præcipue subpilosus; *pinnæ* 22-jugæ, 4–6-natim aggregatæ, pinnis cujusque gregis confertis subcontiguis, lineari-lanceolatæ, acumine abrupto subulato, supra subtusque ad venulas pilis fulvis mollibus sparsæ. *Aculei* erecto-patuli nigri tenues trigoni plerumque solitarii, longiores vix pollicares brevioribus immixti.

Spadices infrafoliares 3½-pollicares, pedunculo setis pilisque villoso angulo recto flexo, ramis 3–4 subparallelis horizontalibus. *Spatha* interior 4-pollicaris aculeis appressis armata.

Flores ♀: *corolla* fructus patelliformis truncata 3- vel plurifissa, extus villosa. *Drupæ* pro planta minutæ, diametro 2-lineari, globosæ, rostello tubulari apiculatæ, pilis squarrosis sparsæ, dense tenuiter striatæ, sicciusculæ.

14. B. BALANOPHORA, sp. n.

Hab. in sylvis fl. Negro prope S. Carlos sub arborum excelsarum umbra (*Spruce, hb. Palm.* 53).

Caudex solitarius 15-pedalis, diametro sesquipollicari, raro erectus, aculeatus, inferne demum calvescens.

Folia pauca (4–5) contemporanea, 4½-pedalia, suberecta, pinnata; *petiolus* 2-pedalis ad vaginam aculeatissimus, superne et ad rhachin parum armatus; *pinnæ* 28-jugæ, inferiores 2-natim, superiores 3-natim aggregatæ, 20×1-pollicares, lineari-lanceolatæ sensim tenuiacuminatæ, supra 1-costatæ, subtus venis venulisque pluricostulatæ et ad costulas pilosæ, margine aculeolis tenuibus sparsis ciliatæ. *Aculei* petioli sæpius ad lineam semiverticalem 6-natim aggregati, longitudine varia, majores sesquipollicares, nigri, tenues, trigoni vel subplani, squarrosi divaricative.

Spadices simpliciter ramosi scopæformes; *pedunculus* florifer 2½-pollicaris, fructifer 4-pollicaris, medio abrupte decurvus, subappresso-setosus tomentosusque mox calvescens; *rhachis* vix sesquipollicaris; *rami* conferti 12-13, penduli, 4-5-pollicares, villoso-incani, pro florum receptione alveolati. *Spathæ* elongato-fusiformes coriaceæ: exterior 7-pollicaris ferrugineo-stupposa primum setulosa mox calvescens; interior fere 10-pollicaris densissime aculeolata setosaque.

Flores confertissimi, masculis fœmineos pauciores circumstantibus. *Fl.* ♂ majusculi obovato-triquetri; *calyx* corolla 2-3-plo brevior membranaceus albidus 3-partitus (arte explanatus fere triangularis); *corolla* rufo-purpurea crasse coriacea ad medium usque trifida. *Stamina* 6, e toro corollæ fundum replente eidemque adnato oriunda; *filamenta* tenuiuscula corolla longiora æstivatione implicata; *antheræ* oblongæ versatiles, loculis parallelis apice ultra connectivum breviusculum productis liberis. *Fl.* ♀: *calyx* pergamineus annulatus obsolete 3-dentatus corolla multo brevior. *Corolla* crassa lignosa gibboso-urceolata ore constricto obsolete 3-dentato, extus fibrillis tortis griseis cum badiis mixtis subappressis lanata. *Ovarium* ovoideum villis badiis deciduis sparsum; *stigmata* tria sessilia carnosa triangularia, demum patula, supra papillis badiis clavæformibus dense obsita. *Drupæ* 6×3½-lineares ovoideæ superne attenuatæ apice ipso obtusæ, coccineæ (demum nigræ?) in cupulam (*i. e.* corolla aucta) validam lignosam basi receptæ; *mesocarpium* tenuissimum vix edule.

15. B. CONCINNA, *Mart. Palm.* 99. t. 72.

Hab. in sylvis recentioribus siccioribus fluvii Negro secus ejus ostia (*Spruce, hb. Palm.* 8). "In sylvis aboriginibus propter fluvios Amazonum et Solimoes" (*Mart. l. c.*).

Caudices multi ex eodem rhizomate orti, 10-14-pedales, diametro 9-lineari, raro erecti, sæpius nutantes, aculeati, vaginis paucis persistentibus superne velati, internodiis 2-3-pollicaribus, ligno tenaci.

Folia æqualiter pinnata, 5-pedalia; *petiolus* pube badia furfuracea obsitus, sparse aculeatus, aculeis badiis tetragono-acicularibus 1-2-pollicaribus plerumque squarrosis; *pinnæ* 28-jugæ, 16 pollices longæ, 10 lineas latæ (superioribus brevioribus) lineares sensim tenuiacuminatæ, plicis circiter sub 3 percursæ basi reduplicatæ, margine et costa media secus apicem setoso-ciliatæ.

Spadices e vaginis jam aphyllis orti, 9-12-pollicares, simplices, penduli; *pedunculus* lepra ferruginea et setis mollibus appressis vestitus. *Spatha* interior fusiformis, aculeis dense armata.

Flores ♀ . . . . . . *Drupæ* magn. pruni damasceni, nigræ, nitidæ, oblongæ, e pressione mutua angulosæ, apice depresso rostello trigono; *mesocarpium* tenue dulce.

Var. INUNDATA.

Hab. in ripis fluvii Negro inundatis ad ejus ostia (*S. hb. Palm.* 8 A);

etiam per totas ripas fluminum Amazonum, Huallaga et Pastasa, ad Andium radices usque.

Pinnæ breviores angustioresque quam in forma typica, subobovato-lineares, acumine breviore et magis abrupto, costa media sæpe per totam longitudinem aculeolata setosave; aculeis petioli prælongis sæpe 3-pollicaribus.

Flores utriusque sexus adsunt. ♂ *flavi*; *sepala* 3 perbrevia inæqualia acuta; *corolla* multo longior cartilaginea trigona profunde tripartita, laciniis ovatis subrepandis; *stamina* 6 perigynæ, antheris versatilibus. *Fl.* ♀: *calyx* globoso-urceolaris, ore constricto subrepando; *corolla* brevior inclusa platystoma extus lanata.

DESMONCUS, *Mart.*

Of this genus, which in its sarmentose stems and prickly cirrhate leaves is the only western analogue of the eastern *Calami*, although so widely diverse in its other characters, I seem to have gathered but two species; but *Desmonci* so frequently and prejudicially crossed my path, that I must have left many other forms ungathered. One of the two seems to be the *D. macracanthos*, described by Martius, and well figured by Wallace (plate 27). But besides this species, Martius describes seven others, whereof four are proper to the Amazon valley, one of the four having been found by Pöppig in Eastern Peru (Maynas).

Karsten merges Martius's genera *Desmoncus* and *Guilielmia* in the *Bactris* of Jacquin; but the first of these is certainly as well-marked and distinct a group of species as almost any recognized genus of palms. Its very obvious differences from *Bactris* are:—the scandent habit; the opposite pinnæ, whereof the lower are so narrowed at the base as to be spuriously petiolate and almost exactly lance-shaped, and the upper 6 or 8 pairs are transformed into straight tough subulate spines so reflexed at an acute angle as to catch firm hold of any soft substance that brushes against them; the petiole consisting almost entirely of sheath (the rhachis being pinnate almost to the base, where it is abruptly decurved from the stem) and the sheath prolonged upwards into an ocrea 3 inches long; whereas in the *Bactrides* the sheath has either only a ligule at the mouth, or it extends into a very short oblique ocrea, and, besides the sheath, there is a proper petiole of from 1 to 2 feet long.

Besides these differences, no *Desmoncus* has leaves ciliated with aculeoli; while every *Bactris* has them so, if not all along the margin, at least in a pencil at the point of the leaf.

I have examined too few flowers and fruits of *Desmoncus* to be able to institute a thorough comparison with those parts in *Bactris*; but in the former the petals of the ♂ flowers are drawn out into slender points, whereas in the latter they are merely acute; and the endocarp of *Desmoncus* is so thin that the fruit has barely a claim to be called a drupe.

1. D. RIPARIUS, sp. n.

Hab. in ripis fluminis Negro prope pagum San Carlos (*S. hb. Palm.* 46).

Caudex tenuis (diametro semipollicari) flexuosus, arboribus vicinis ope foliorum cirrhiferorum alte scandens, foliosus.

Folia 3-pedalia pinnata; *petiolus* vaginans; vagina inermis, in ocream 3-pollicarem ore obliquam longiciliatam producta; *rhachis* glabrata aculeis validis nigrescentibus deorsum uncinatis per totam longitudinem armata; *pinnæ* 14–16-jugæ, inferiores oppositæ vel subalternæ, 5×1½-pollicares ad 7×1¾-pollicares, lanceolatæ tenuiacuminatæ, basi in petiolulum spurium attenuatæ, plicatæ, subtus ad costam plerumque aculeis 2 dissitis rectis squarrosis armatæ, jugorum 6 v. 7 superiorum in spinas cirrhosve exacte oppositos subpollicares subulatos acute retrorsos (sed rectos nec uncinatos) mutatæ.

Spadices 9-pollicares (pedunculo sub-5-pollicari incluso) simpliciter ramosi subpinnati, axi rectiusculo; *rami* 8–10 sesquipollicares tenuiusculi spiraliter flexuosi, alveolis haud profundis obscure subdistichis. *Spathæ* lignescentes mox glabratæ aculeis paucis conico-acuminatis armatæ; exterior 7-pollicaris dorso obtuse bicarinata; interior 11-pollicaris anguste fusiformis spadicem alte superans basi integra et pedunculum vaginans.

Flores cujusque alveoli normaliter tres, fl. inferiore ♀, 2 superioribus ♂. *Fl.* ♀: *calyx* (fructus) disciformis cupularisve 3–4–5-fidus, lobis latis apice trigonis; *corolla* duplo longior profunde trifida, lobis subquadratis apice triangularibus apiculatis. *Drupæ* 5½×5-lineares late obovoideæ rostellatæ; *mesocarpium* tenue sicciusculum; *endocarpium* tenue apice triporosum.

2. D. MACRACANTHOS, *Mart. Palm.* 86.

Hab. "in sylvis necnon inter virgulta provinciæ Paraënsis atque Cayennæ frequens" (*Mart. l. c.*; *Aublet, &c.*). Prope Pará ipse legi (*hb. Palm.* 82.), et ad fl. Negro amicus Wallace (*Palms*, pl. 27).

Cum descriptione Martiana congruere videtur et a *D. ripario* differt *vaginis ocreisque valde aculeatis nec inermibus*; pinnis subovato-lanceolatis longius acuminatis; *aculeis rhachis anticis rectis* subcompressis, posticis validis conico-acuminatis hamatis; etc.

Flores ♂ adsunt, cujus descriptio sequitur. *Calyx* minutus membranaceus trifidus, laciniis triangularibus subacuminatis. *Corolla* calyce

multo longior, 4½ lineas longa, coriacea, fere ad basin usque tripartita, petalis ovato-lanceolatis tenuiacuminatis. *Stamina* 6; *filamenta* brevissima subulata supra torum corollæ fundum replentem marginalia (subperigyna); *antheræ* erectæ corollæ ¼ vix æquantes oblongæ basi sagittatæ, loculis apice concretis.

ASTROCARYUM, *Meyer*.

Of this genus I have preserved descriptions made on the spot and specimens of but two species, although several more exist in the forests and along the banks of the Amazon. *A. Jauari*, Mart., is one of the commonest riparial palms; and its clustered, rather slender but very prickly stems, 30 to 40 feet high, contribute to give a forbidding and monotonous aspect to low, inundated shores, where it often abounds to the exclusion of every other palm.

A. vulgare, Mart. (=" Tucúm " in Brazil, =" Chambíra " in Peru, =" Cumári " in Venezuela), and *A. Tucumá*, Mart., are common forest palms, with a stout trunk rarely exceeding 60 feet in height. From the cuticle of their fronds (especially of *A. vulgare*) are made mats, coarse hats, and the strongest hammocks, fishing-lines and nets known on the Amazon.

A. Murumuru, Mart., rarely exceeds 15 feet in height; but it has the same sort of pinnate leaves, white on the underside, as the two former; and still more formidable prickles that are often more than half a foot long. It grows, not only in moist sandy flats or hollows of the forest, but on the very banks of the Amazon, and of its white-water tributaries (such as the Huallaga), all the way up to the foot of the Andes.

A. Munbaca, Mart., and *A. gynacanthum*, Mart., are two species of humbler growth, occurring often in some abundance in old clearings, along with prickly *Bactrides* of similar habit. They well deserve their Tupi name, "Munbáca" (Awakeners!), from the lancet-like flat prickles, 2 inches long, with a fine point and sharp cutting edges, which are capable of inflicting severe wounds on the unwary traveller. I was once run through the upperside of a finger-joint by a prickle of *Munbaca*, and could make little use of that finger for long afterwards; nay, even after the lapse of 16 years, it is occasionally paralyzed when the other fingers are unaffected.

The fruits of these two palms have a thin softish pericarp, of an orange colour and sweet taste, which, when quite ripe, splits up into about six laciniæ, that spread back like a stellate corolla, and finally allow the endocarp to fall out. It was doubtless this peculiarity which led Meyer to give the name "*Astrocaryum*" to his original species (*A. aculeatum*, Mey. Esseq. 266), which, along with *A. Munbaca* and *gynacanthum*, are probably the only true species of the genus—the other species included under *Astrocaryum* by Martius all varying considerably from the type, and none of them having (so far as I have seen) a dehiscent pericarp.

The *Astrocarya* are described by Martius and others as having a simple spathe; but those which I have been able to examine have certainly two spathes, whereof the outer and thinner often falls away at an early stage, which perhaps accounts for its having been overlooked. The cupulate andrœceum of the ♀ flowers, adnate to the corolla, although not mentioned by Martius, seems indicated by the "calyx internus basi in annulum membranaceum elevatus."

A. humile, and probably some other species included in *Astrocaryum* by Martius and Kunth, correspond precisely to Karsten's "*Guilielmia*" in the two spathes, the gamophyllous flowers of both sexes, and the andrœceum of the ♀ flowers adnate to the corolla. But many botanists will choose to keep the original "*Guilielmia*" (of Martius) distinct from *Bactris*, in which it is merged by Karsten; and (in any case) that name cannot well be taken from the species to which its author applied it, and appropriated to a totally distinct group. Karsten's genus "*Marara*" differs from his "*Guilielmia*" in having the calyx of both sexes, as well as the corolla of the males, triphyllous, but agrees with it in the adnate andrœceum and other characters. But unless there be some degree of imbrication as well as complete separation of the petals, the latter character is of little generic value, as is proved by some species of *Geonoma* having the petals free to the base, while their near allies have them united into a gamopetalous corolla.

Until, therefore, the whole tribe of Prickly Cocoineæ shall have been revised from ample materials, I prefer to continue to place the two species below described in *Astrocaryum*, where Martius placed them, although neither of them agrees perfectly with his character of that genus, nor are they themselves indisputably congeneric.

1. A. MUNBACA, *Mart. Palm.* 74: caudice tenui 8–12-pedali aculeato; foliis 5-pedalibus æqualiter pinnatis aculeatis, pinnis vix sesquipedalibus lineari-lanceolatis acuminatis supra glabris subtus albido-puberulis setulosisque margine setoso-ciliatis; spadicibus monoicis bipedalibus simpliciter ramosis, floribus ♀ ad rhachin primariam solitariis sessilibus et ex eorum axillis ramulum masculum proferentibus; spathis 2, exteriore membranacea inermi ancipiti-bialata 8-pollicari decidua, interiore triplo longiore coriacea aculeata persistente; drupis subpollicaribus oblongo-obovatis aurantiacis, pericarpio pulposo demum stellatim 6-fido patuloque.

Hab. "in sylvis aboriginibus prope urbem Para" (Mart.); ipse autem fere semper in sylvis *recentioribus* vidi. Ad flumen Tapajoz, prope urbem Santarem, et per fluvium Negro, in sylvis quondam cultis "Caa-poéras" dictis, sat frequens est, et fructus ab incolis comeduntur (*S. hb. Palm.* 38; 31 *ad Mus. Kewense*).

Caudex tenuis 8–12-pedalis, inter annulos confertos aculeis complanatis, aciebus apiceque acutissimis, longitudine varia (longioribus bipollicaribus) armatus.

Folia 5-pedalia pinnata; *rhachis* supra acute carinata minute leproso-puberula aculeata, aculeis 2½-pollicaribus cum brevioribus mixtis; *pinnæ* æquidistantes, inferiores alternæ, superiores oppositæ, lineari-lanceolatæ acuminatæ, subplicatæ, setis nigris subciliatæ, supra glabræ, subtus dense minute albido-puberulæ et setulis albidis basi tuberculosis sparsæ, mediæ fere sesquipedales, latitudine subpollicari; *venæ* cujusque pinnæ 7, angulo costali acuto (30°).

Spadices bipedales aculeati; *rhachis* indivisa (rarius bifida) floribus ♀ onusta, spica ramulove ♂ obtuse trigono brevipedicellato floribundo e cujusque floris ♀ axilla oriundo. *Spathæ* 2: exterior 8-pollicaris fusiformis ancipiti-bialata membranacea badia inermis cito caduca; interior fere bipedalis coriacea, dimidio inferiore teres pedunculum vaginans, superiore anguste fusiformis antice fissa, aculeolis tenuibus nigris basi albidis armata.

Flores ♂ hexandri...... *Fl.* ♀: *calyx* et *corolla* cupulatus, margine plurisinuatus, primitus squamulis aculeolisve subulatis nigris nitidis vestitus. *Drupæ* subpollicares, miniatæ v. aurantiacæ, oblongo-obovatæ, pressione mutua basi polygonæ, stigmatibus 3 persistentibus coronatæ; *pericarpium* (epicarpium membranaceum cum mesocarpio pulposo dulci) fere regulariter in lacinias sub 6 stellato-patulas fissum, et ideo, endocarpio nigro osseo deciso, florem hexapetalum simulans.

2. A. ACAULE, *Mart. Palm.* 78, t. 24–63. f. 5: caudice nullo; foliis plurimis 10-pedalibus inæqualiter pinnatis aculeatis, pinnis sub-67-jugis 2–4-natim aggregatis bipedalibus linearibus sensim acutatis recurvo-pendulis margine setoso-ciliatis cæterum glabris

subtus albidis; spadicibus dioicis (?) subbipedalibus simpliciter ramosis scopæformibus albido-furfuraceis, ramis 3-pollicaribus paucifloris; spathis 2 validis bipedalibus et longioribus, exteriore v. inermi v. subarmata, interiore crebre aculeata; drupis subpollicaribus obovatis cinerascentibus.

Hab. "in arenosis prope Barra do Rio Negro, alibi in eadem provincia, et in insulis fluminis Amazonum" (*Mart.*). In sylvis humilioribus arenosis fl. Negro superioris præcipue secus San Carlos (*S. hb. Palm.* 47; *etiam Wallace, Palms,* pl. 44).

Caudex nullus.

Folia radicalia plurima 10-pedalia, e basi erecta arcuato-inclinata, pinnata; *petiolus* 4½-pedalis et rhachis furfuraceo-tomentellus miniatus, purpurascens, v. ad rhachis faciem superiorem albidus; *pinnæ* 67-jugæ, 2-4-natim aggregatæ, lineares longe sensim angustatæ, recurvo-pendulæ, basi arcte reduplicatæ, præter ad costam elevatam subplanæ, venulis pluristriatæ, subtus albidæ, setulis brevibus nigris ciliatæ, mediæ subsesquipedales, 7 lineas latæ. *Aculei* nigrescentes nitidi, ad petiolum rhachimque hic illic ternatim aggregati, majores 3-pollicares et longiores, basi 2 ad 3 lineas lati, fere complanati, aciebus acutis, acumine valde pungente.

Spadix subbipedalis (pedunculo valido subcompresso albescente incluso), ut videtur unisexualis, simpliciter ramosus scopæformis, tomento furfuraceo albido obsessus; *rami* plurimi 3-pollicares tenues flexuosi, hic illic in receptacula lignosa obconica v. subhemisphærica apice concava uniflora (pedicellos abbreviatos sistentia) dilatati. *Spathæ* 2, bipedales et longiores, valide coriaceæ, ultra medium pedunculum vaginantes, supra medium fusiformes et antice rimosæ; exterior recta (ætate convoluta) fusca striata et vel inermis vel aculeis tenuibus planis ½-¾-pollicaribus sparse armata; interior purpureo-badia aculeis adscendentibus crebrius armata, demum aperta et supra spadicem insigniter fornicata.

Flores (♂ non vidi) ♀ ad quemque ramum 2-5, ad receptacula solitarii, bracteis 3 elongato-triangularibus obtusatis intra receptacula persistentibus stipati, coriacei. *Calyx* et *corolla* probabiliter primum cupularis vel urceolaris, fructûs tamen ille tripartitus, hæc trifida calycem paulo excedens 3-linearis, sed ambo varie multifida. *Andrœceum* sterile cupulare, corolla dimidio brevius eidem arcte adhærens, transverse striatulum. *Drupæ* subpollicares obovatæ rostellatæ sicciusculæ cinerascentes.

Obs.—Cum descriptione Martiana haud perfecte congruit, sed a differentiis momenti levioris, et præcipue ex habitatione conformi, verisimiliter eadem species erit. *A. humile,* Wallace (*Palms,* pl. 45), caudicis præsentia etiamsi perbrevis, et drupis setosis bene differt.

Cocos, *Linn.*

I introduce this genus for the sake of describing under it a Palm of the Upper Orinoco, but with considerable doubt as to whether this is really its proper place. The whole of the Unarmed Cocoineæ, but especially those with hexandrous ♂ flowers, are in fact so closely allied that it is difficult to say whether they should constitute one genus or many, and (in the latter case) on what characters to found their delimitation. Martius describes *Cocos* with a solitary spathe, and makes no mention of an hypogynous cup (or sterile andrœceum); yet Karsten attributes to *Cocos* both an hypogynous cup and a double spathe, and frames his genus *Platenia* for the reception of the species with a solitary spathe*. The species described below has certainly a double spathe, and would perhaps be referred by Dr. Martius to his genus *Syagrus*, which itself seems to be no more than a subgenus of *Cocos*.

C. ORINOCENSIS, sp. n.

Hab. in montibus graniticis fluminis Orinoco secus cataractas, valde frequens, gregaria.

Caudex 12–60-pedalis gracilescens, diametro haud semipedali, annulatus, lævis, inermis, et (foliis marcidis omnino deciduis) ad apicem foliosum usque nudus.

Folia flavo-viridia, inferiora arcuato-pendula, superiora subpatula v. fere erecta, inæqualiter pinnata, 6½-pedalia; *petiolus* 2-pedalis facie superiore caviusculus basi vix dilatatus, vagina brevi fibrilloso-membranacea cito decidua; *pinnæ* 78–80-jugæ, 2–3-natim fastigiatæ, mediæ fere bipedales, 10 lineas latæ, lineares apice longe sensim angustatæ, basi reduplicatæ, haud falcatæ sed pendulæ.

Spadices 1¼-pedales simpliciter ramosi, tres contemporanei sed a diversorum foliorum axillis orti; *rami* polystichi conferti flexuosi 9–12-pollicares, tertio inferiore flores ♀ 7–10 alternos solitarios ad flexuras proferentes, apice tenuiore flores ♂ (ut videtur binatos bracteola stipatos) gerentes. *Spathæ* 2: exterior brevis 9-pollicaris compressa anceps; interior lignescens 2⅓ pedes longa, circumferentia majore 5-pollicari, e basi tenui vaginante fusiformis cuspidata antice rimosa et demum (fructu maturato) explanata.

Flores ♂ jam delapsi fuerunt. *Fl.* ♀ trigono-urceolares vix semipollicem alti. *Sepala petalaque* oblato-cordato-triangularia obtusa late imbricata, hæc sublongiora. *Andrœceum* sterile cupulare, vel potius late annulare, corolla 4-plo brevius. . . . . . *Drupæ* magnitudine ovi columbini, e cinereo flavidæ, mesocarpio eduli sapore druparum *Maximilianæ regiæ.*

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* "Plantæ Columbianæ," Linnæa, 1856, p. 249.

Obs.—Anne potius ad genus *Syagrum* (Martii) referenda, quum spatha duplex invenitur?

This handsome Palm, notable for its short curling yellowish foliage, forms large beds on the bare granite of the mountains of the Orinoco, between the mouths of the Vichada and Meta. It is a conspicuous ornament on the Cerro de Mono and on the hills around Maypures, ascending to their very summits, about 1000 feet above the river. Near the cataracts there are fruiting specimens no more than 12 feet high, and few exceed 30 feet; but on the mountains there are others 50, or even 60 feet high. The fruit was just ripe at the time of my visit to Maypures, in June, 1854. It is a yellowish-grey drupe, like that of *Maximiliana regia*, and the hardish mesocarp is edible but insipid.

At Maypures I heard this Palm called "Corozito"—a name that seems common to many Palms with hard kernels.

MAXIMILIANA, *Mart.*

The Palm about to be described—I regret to say, very incompletely—is so obviously a congener of *Maximiliana regia*, Mart. (the "Inajá" of the Brazilians), that I introduce it here, although my notes on the fresh plant are very brief, and I am unable to reconsult the specimens deposited in the Kew Museum. But it is doubtful how *Maximiliana* is to be kept apart from *Cocos.* The spadices being alternately male and bisexual (with ♀ flowers on the lower part of the branches and ♂ flowers on the upper)—or, as Martius has it, "spadices in eadem stirpe alii androgyni, alii masculi"—is a character common to many Palms: we have seen it to be frequent in *Geonoma*; and I should expect to find it in undeniable species of *Cocos*, as well as of *Maximiliana.* Karsten compares *Maximiliana* with his own *Scheelea* and with *Attalea*, Mart., from both of which it is said to differ in the exserted stamens, and from the former in the plane (not terete) petals. But Martius's second species of *Maximiliana* (*M. insignis*), which he describes with ♂ flowers "non supra femineos in eodem ramo positi, sed ad eorum latera provenientes," is removed by Karsten to *Scheelea.* I very much doubt the generic importance of these differences.

Maximiliana Inajai, like *M. regia*, has the woody boat-like

spathes persisting on the trunk for years after the spadices have fallen.

M. Inajai, sp. n.

Hab. in sylvis fluminis Negro subripariis, præcipue secus ejus ostia. *Inajaí* Brasiliensium (*S. hb. Palm.* 6; ad *Mus. Kew.* 83).

Caudex 10–20-pedalis, gracilis, diametro 3-pollicari, ligno molli, annulis spatio semipedali dissitis.

Folia 8-pedalia patula inæqualiter pinnata; *petiolus* brevis et *rhachis* ferrugineo-leprosa; *pinnæ* 80-jugæ. 3–4-natim (secus apicem binatim) aggregatæ, mediæ 25×1¼-pollicares lanceolato-lineares abrupte cuspidato-acuminatæ, inferiores longiores (30-pollicares) angustioresque, omnes præter costam mediam sub 8-veniæ.

Spadices inter folia oriundi simpliciter ramosi........*Spatha* unica 25×3-pollicaris anguste fusiformis crasse lignosa extus plurisulca, basi in vaginam 8-pollicarem angustata, post spadicis lapsum longe persistente.

Attalea, *Humb. et Kunth.*

1. A. Humboldtiana, sp. n.: caudice robusto altitudine mediocri lævi subnudo; foliis maximis 32-pedalibus æqualiter pinnatis, petiolo vix ullo, rhachi e lateribus valde compressa, pinnis 200-jugis et pluribus linearibus acuminatis, mediis 4½-pedalibus, basalibus longioribus; spadicibus 5-pedalibus simpliciter ramosis fructu pendulis, ramis androgynis apice solo masculis; drupis plurimis 2-pollicaribus ovalibus rostratis sicciusculis, epicarpio fuscescente.

Hab. ad ripas fluminis Orinoco supra cataractas, etiam fl. Cassiquiari supra lacus Vasiva ostia. In humidis camporum sylvarumque ejusdem regionis, e. gr. secus pagum Esmeralda, gregarie viget. *Yágua* ab Indis dicta (*S. hb. Palm.* 43).

Caudex 20–40-pedalis robustus annulatus inermis, secus apicem paucissimis petiolorum reliquiis obvelatus.

Folia plura contemporanea, 32-pedalia, concinne pinnata, e basi erecta arcuato-pendula; *petiolus* perbrevis e basi dilatata amplexante semicylindricus 5-pollices latus, facie superiore planus cito in rhachim angustatus, ita ut rhachis pro majore parte suæ longitudinis multo magis crassa quam lata est et aciem acutum supra folium ostendit; *pinnæ* 200- ad 213-jugæ, æquidistantes, validæ, angulo recto insertæ basique stricte reduplicatæ, in plano verticali patulæ, lineares sensim in apicem acutum angustatæ, infimæ prælongæ 6½-pedales, latitudine pollicari, mediæ 4½-pedales latitudine bipollicari, apicales vix pedales.

Spadices inter folia oriundi, 4 v. 5 contemporanei, 5-pedales, simpliciter ramosi, fructu penduli; *pedunculus* 2½-pedalis decurvus subteres, circumferentia 7-pollicari; *rami* sub 100, polystichi conferti subcompressi flexuosi 7-pollicares, flores ♀ sub 11 solitarios sessiles gerentes, apice solo sesquipollicari flores ♂ sub 10 confertos. proferentes. *Spatha* simplex maxima, 7½-pedalis, circumferentia 16-pollicari, lignescens, fusiformis, basi in vaginam bipedalem, apice in rostrum compressum pedale attenuata, dorso plurisulca, antice rimosa.

Flores ♂ minute tribracteolati, in meo specimine fructifero jam decisi. *Fl.* ♀: *bracteolæ* 6, biseriatæ, 3 exteriores minutæ triangulares; trium interiorum intima major reniformis apiculata duplo latior quam longa (4½×2-linearis), cæteræ duæ parvæ sæpe in unam bicuspidatam coalitæ. *Sepala* 3, 9 lineas longa 8–9 lin. lata, erecta crasse coriacea cordato-triangularia concava imbricata. *Petala* 3, coriacea, oblato-cordata v. reniformia, apiculata, 7×9½-lineari. *Urceolus* hypogynus liber, 3 lineas altus, ore obsolete 6-angularis petalis tenuior. *Drupæ* sub 1000 cujusque spadicis maturatæ, 2 pollices longæ, 1–1¼ poll. latæ, ovales v. ovali-oblongæ sæpius pressione mutua subprismaticæ, styli basi conica 4-lineari persistente rostratæ. *Epicarpium* fuscescens decidue leprosum minute striatum. *Mesocarpium* 3 lineas crassum, e laminis fibrosis, exterioribus mollioribus separabilibus, interioribus in massam ligneam concretis, constans. *Endocarpium* ¾ lineæ crassum, osseum nigrescens, mesocarpio adnatum, supra basin 3-foraminatum, 1-2-loculare, loculis in drupa nondum maturata vacuis.

This noble but not very lofty Palm is the one mentioned by Humboldt in the following terms: "Nature has lavished every beauty of form on the Jagua Palm*, which, intermingled with the Cocurito or Vadgihai (80 to 100 feet high), adorns the cataracts of Atures and Maypures, and is occasionally found also on the lonely banks of the Casiquiari. The smooth slender stems of the Jagua, rising to between 60 and 70 feet, appear above the dense mass of foliage of other kinds of trees, from amidst which they spring like raised colonnades, their airy summits contrasting beautifully with the thickly-leaved species of *Ceiba*, and with the forest of *Lau-*

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* The correct Spanish orthography is "Yagua." In "Jagua," as Humboldt writes the name, his "j" has the German sound, viz. that of our "y." That great traveller was not uniform in his orthography of native Venezuelan names, sometimes writing them according to the Spanish, and at others to the German, sound of the letters. In one case he mixes the two modes in a single word, viz. in "Cheruvichahena," the name of a native tribe, whose correct orthography in Spanish is "Jerubichajena."

The Cocurito palm is *Maximiliana regia*, Mart.

rineæ, Calophyllum, and different species of *Amyris* that surround them. The leaves of the Jagua, which are few in number (rarely so many as 7 or 8), are 16 or 17 feet long, and rise almost vertically into the air; their extremities are curled like plumes; the ultimate divisions, or leaflets, having only a thin grass-like parenchyma, flutter lightly round the slowly balancing central leaf-stalks."—*Aspects of Nature*, "*Physiognomy of Plants.*"

Of this account it is to be remarked:—(1) that the dimensions are probably mere estimates; for I found the leaves double the length, or 34 English (=32 French) feet, and I counted on one leaf 213 pairs of pinnæ; and (2) that Humboldt, writing (as he says) after he had left the country, has probably mixed up his impressions of the *Yagua* and of the Palm described above under the name of *Cocos Orinocensis*; for the latter abounds much more at the cataracts than the Yagua, and it has only a few leaves at a time, whereas the crown of the Yagua contains usually a great many leaves. However that may be, the Palm above described (from a noble specimen that I hope may still be standing at the bifurcation of the Casiquiari) is certainly what is called "Yagua" at this day. Its most striking feature is that the pinnæ are arranged vertically, and not horizontally as in other Palms, and it is caused by the rhachis being so much thinned away at the sides—so very narrow in proportion to its thickness*—that it bends in the plane of the pinnæ, and not in a plane perpendicular to that plane as in the generality of palms. The leaves spring up almost perpendicularly at the base, but in the upper part arch over, to one side or the other, as the wind sways them. The pinnæ stand at right angles to the rhachis, and while those on the lower side of the arch hang straight down, those on the upper side point straight up, and from their constrained position quiver and flutter with every breath of air†.

In a letter written to Sir W. Hooker just after my return from the Casiquiari to San Carlos, I referred the Palma Yagua to *Maximiliana*, moved thereto by having found an hypogynous cup in the ♀ flowers, such as Kunth in his 'Enumeratio' (following Martius) attributes to *Maximiliana*, but not to either *Attalea* or *Cocos*. But when I consider the habit of this palm, and the equably pinnate leaves with very numerous large leaflets —so like those of *Attalea excelsa* and *speciosa* of the Amazon— I can scarcely doubt its being a congener of those two species. As I have no male flowers, and those of *Attalea* should be polyandrous (stamens 9–24), there is still a doubt whether it ought rather to be referred to *Scheelea*, Karst., which has hexandrous male flowers with terete petals (the petals of *Attalea* being plane). It might even prove to be scarcely distinct from the "Palma Real" of the Magdalena and Cauca, *Scheelea regia*, Karst., which has "folia æqualiter pinnata 24-pedalia, pinnis 180–200-jugis 4–5-pedalibus, &c." If, however, I rightly understand what Karsten says of *Scheelea*, "flores ♂ pedunculum communem tegentes, fl. ♀ versus ramorum basin pauciores," it is different from the structure of the Yagua described above. And here the matter must rest until some traveller procure perfect flowers of both sexes.

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* At midway of leaf, the rhachis is 9 lines thick (*i. e.* perpendicularly to plane of leaf), 4 lines broad at back, and in front tapers to an edge; at the apex it is still more compressed.

† Something of the same kind is occasionally seen in the leaves of *Cocos nucifera*, but only near their points, where a half-twist of the rhachis brings a few of the upper leaflets into a nearly vertical position.

2. A. RACEMOSA, sp. n.: caudice nullo; foliis 12-pedalibus æqualiter pinnatis recte arcuatis, pinnis 90-jugis linearibus acutis; spadicibus 3–4-pedalibus simplicibus arcuatis, pedunculo subcompresso; floribus (♀) racemosis 2–3-stichis secundis brevissime pedicellatis; drupis majusculis.

Hab. in sylvis Venezuelæ borealis inter fluvios Negro et Guasié, ubi sub arborum excelsarum umbra gregarie crescit. *Téco* ab Indis Barré nuncupatur (*S. hb. Palm.* 54).

Caudex nullus.

Folia plurima, omnia radicalia, sub-12-pedalia, concinne pinnata, arcuata; *petiolus* brevis validus; *pinnæ* 90-jugæ horizontaliter patulæ fere rectæ lineares acutæ.

Spadices radicales unisexuales (dioici?) 3–4-pedales, simplices; *pedunculus* elongatus tenuis subcompressus arcuatus; *rhachis* brevis $\frac{1}{2}$–1-pedalis. *Spatha* unica spadicem excedens, vagina basali $1\frac{1}{2}$–2-pedali, limbo anguste fusiformi longe cuspidato demum antice rimoso.

Flores ♀ racemosi unilaterales (terram spectantes) 7–21 ad quemque spadicem. *Pedicelli* (v. si mavis, ramuli uniflori) alterni distichi v. subtristichi, breves ($\frac{1}{4}$–$\frac{3}{4}$-pollicares), plerumque solitarii, rarissime binati, crassi compressuli ancipites uniflori, basi bractea (spathella) triangulari-acuminata amplexante stipati. *Bracteæ* 3, cordato-triangulares latissime amplexanti-imbricatæ, intima multo majore, receptaculum floris convexum fibroso-papillosum circumambientes. *Calyx*...... *Drupæ* magnitudine ovi cygnei......

Obs.—There are no scars, or other indications of ♂ flowers fallen away, on the spadices in my specimen, whence I conclude them purely female. No other *Attalea* seems to have spadices so slightly branched; but the habit is so exactly that of the stemless forms of *A. compta* and *spectabilis*—the leaves, with broad flat pinnæ that do not curl in drying, and so fit them admirably for thatch, being the same, as well as the large hard drupes—that (in the absence of flowers, both ♂ and ♀) I venture to refer it to the same genus.

It is probable that some of the loftier Palms of the Amazon valley, which still remain to be described, are species of *Attalea*. A very fine Palm, closely resembling *A. speciosa*, Mart., but with drupes that turn red when ripe, adorns the banks of the Upper Amazon from the Peruvian frontier to the Andes; and north of the Amazon, in the roots of the Equatorial Andes, there is an *Attalea*, known by the Quichua name of "Biroti-huasi," which has a beard to the petioles similar to that of the *Attalea funifera* of South Brazil, but not long enough to make ropes of.

MAURITIA, *Linn. f.*

We enter now on a group of Palms distinct from all those previously described, not only by the important character of the scaly or loricated fruits, but by the pinnately branched spadices, which are destitute of any universal envelope, or spathe, and have instead the peduncle, rhachis, and primary branches (at least) completely encased in imbricated sheaths (spathellæ). The fan-shaped leaves, which become so through the rhachis being so excessively contracted that the laciniæ or pinnæ appear to all spring from nearly the same point, is a character of less importance; for there is one American genus (*Rhaphia*) and several Asiatic genera of Scaly-fruited Palms which have elongated leaves of the ordinary type.

It is difficult to decide whether *Mauritia* (as I understand it) should constitute but one, or be divided into three genera. The pretty little Palms called *Lepidocaryum* by Martius are exactly miniature Mauritias in the habit, the flabellate leaves, the spadices, the structure of the flowers and fruits. It is only in the arrangement of the flowers on the spadix that a tangible character is found to separate them; for in *Lepidocaryum* the flowers are distichous on the ultimate branches or spikes ("amenta" of Martius)—solitary on the female, geminate on the male spadix; whereas in *Mauritia* the male flowers (at least) are polystichous on the spikes.

The large handsome Palm which Mr. Wallace was the first to figure and describe, under the name of "*Mauritia Carana*" (Palms, pl. 18), differs in the structure of the male flowers from both the above, having the petals united into a hypocrateriform corolla, with a slender tube, to which the filaments of the stamens are adnate; whereas in *Mauritia* and *Lepidocaryum* both the lanceolate petals and the stamens are free to the base. I have seen reason, in comparing the structure of the male flowers of other palms, to regard this difference as of only secondary importance; and as I have unfortunately neither female flowers nor fruits of Mr. Wallace's palm, I dare not separate it generically from *M. flexuosa*, with which it entirely agrees in habit, except that the leafy crown reposes on an immense mass of persistent decaying petioles, such as is never seen in *M. flexuosa*. For the present, therefore, I shall speak of it as a subgenus of *Mauritia*, under the name "*Orophoma*," in allusion to its general use on the Rio Negro for the thatch or covering of houses.

The three subgenera of *Mauritia* will therefore stand as follows:—

Fl. ♂ ad ramulos spiciformes polystichi,
    petalis staminibusque liberis ...... EUMAURITIA.
    petalis in corollam hypocraterimorpham coalitis,
        staminibus perigynis .... OROPHOMA.
Fl. ♂ ad ramulos distichi .... LEPIDOCARYUM.

I append a list of all the species known to me, either from my own observation or the descriptions of others.

Subgenus I. *Eumauritia*.

§ 1. *Caudice inermi.* (=*Murití* vel *Mirití* Brasiliensium = *Moríche* Orinocensium = *Achuál* et *Aguáshi* Peruvianorum.)

1. M. FLEXUOSA, *L. f.* Tota America Æquatorialis Cisandina.
2. M. VINIFERA, *Mart.* Brasilia, ad fl. S. Francisco.

§ 2. *Caudice aculeis armato.* (=*Caraná* Paraënsium =*Cahuáia* Orinocensium.)

3. M. MARTIANA, *Spruce.* Fl. Amazonum et Negro.
4. M. ARMATA, *Mart.* Brasilia, ad campos centrales.
5. M. ACULEATA, *H. et B.* Fl. Negro, Atabapo, &c.
6. M. PUMILA, *Wallace.* Fl. Negro superior.
7. M. SUBINERMIS, *Spruce.* Fl. Casiquiari.

Subgenus II. *Orophoma.*

(= *Caranã* incolarum fl. Negro = *Tinámalu* Indorum Barré.)

8. M. CARANA, *Wallace.* Fl. Negro, Casiquiari, et Orinoco.

Subgenus III. *Lepidocaryum.*

9. M. GRACILIS, *Mart.* Fl. Negro, Atabapo, &c.
10. M. TENUIS, *Mart.* Canumá juxta fl. Madeira.
11. M. QUADRIPARTITA, *Spruce.* Rivuli fl. Negro inferioris.
12. M. CASIQUIARENSIS, *Spruce.* Fl. Casiquiari.
13. M. GUAINIENSIS, *Spruce.* Fl. Guainia.

Obs.—Adsunt verisimiliter aliæ species *Mauritiæ* aculeis armatæ in regione fl. Negro et Orinoco superioris, omnes in Brasilia "Caraná," in Venezuela "Cahuaia" dictæ. Baccas solas *Mauritiæ* cujusdam *M. flexuosæ* valde affinis, oblongo-trigonas, duplo longiores quam latas, vidi secus origines fluminum Negro et Atabapo.

Sequuntur descriptiones *Mauritiarum* ab ipso auctore in statu vivo (sæpe quam incomplete!) investigatarum:—

I. *Eumauritia*: floribus polystichis, corollis masculis tripetalis, staminibus liberis.

M. ACULEATA, *Humb. et Bonpl.*: caudicibus plurimis 20–25-pedalibus; frondibus 7-pedalibus flabelliformi-40-partitis, laciniis sub-3-pedalibus pendulis subtus albido-pruinosis ad venas et margines extimos aculeolatis; baccis subglobosis ex apice depresso rostellatis.

Hab. in ripis inundatis fluminis Negro aliorumque aquis nigris manantium, sc. Pacimoni, Atabapo, e. a. frequens, cum *Leopoldinia majore*, Wallace, plerumque consociata (*S. hb. Palm.* 55); "in ripa fl. Atabapo" (*Humboldt*). *Cahuáia* Orinocensium; *Ulíya* Indorum Barré.

Syn. *Mauritia aculeata*, Humb. Ansicht. d. Natur, i. 131; H., B., K., Nov. Gen. i. 311 (nec *M. aculeata*, Mart. Palm. 47, t. 39).—*M. gracilis*, Wallace, Palms, t. 20.

Palma multicaulis, caudicibus usque ad 50 ex eodem rhizomate magno convexo ortis, 20–25-pedalibus, diametro 3-pollicari, flexuosis, exterioribus cæspitis valde inclinatis, aculeis conicis sparsis armatis, ligno duro, annulorum interspatiis subtripollicaribus.

Folia sub 9 contemporanea, fere 7-pedalia, cum petiolis decidua; *petiolus* 3½-pedalis basi ipsa caudicem vaginans, dein canaliculatus, secus apicem subteres; *rhachis* vix 3-pollicaris; *lamina* flabelliformi-

40-partita, laciniis mediis fere 3½-pedalibus, infimis vix ultra 2½-pedalibus, tenuibus, secus medium abrupte pendulis, subtus albido-pruinosis, ad venas etiam ad laciniarum extimarum margines aculeolis ciliiformibus 3–4 lineas longis pallidis medio badiis sursum directis armatis.

Spadices bipinnati, penduli, 2 v. 3 contemporanei.

Flores........*Baccæ* subglobosæ, diametro 1¾-pollicari, basi apiceque depressæ, conico-rostellatæ, squamulis badiis loricatæ.

Obs.—*M. armata*, Mart. Palm. 45, t. 41–43, ad rivulos camporum Brasiliensium reperta, priori valde affinis videretur, et caudicibus pluribus (6–20) ejusdemmodi gaudet; differt tamen foliis subtus solum glaucescentibus et baccis ovatis.

M. Martiana, nobis (=*M. aculeata*, Mart. Palm. 47, t. 39. f. 3, 4, et t. 44, *nec Humb.*), caudice solitario robustiore recto, baccis ovato-globosis acutis, &c. diversa est.

The name of this Palm is a question for the synonymists to settle. I have no doubt of its being the Palm spoken of by Humboldt in his 'Personal Narrative' as "a new species of Bache or *Mauritia*. . . . . This *Mauritia aculeata* is called by the Indians 'Juria' or 'Cavaja;' its leaves are in the form of a fan, and bent towards the ground. . . . . The thorns are not slender and long like those of the Corozo and other thorny Palm trees, but, on the contrary, very woody, short, and broad at the base, like the thorns of *Hura crepitans*. On the banks of the Atabapo this Palm tree is distributed in groups of 12 or 15 stems, as close together as if they rose from the same root." To those who have travelled on the Atabapo this description is sufficient. There is but one Palm that answers to it, and it is more abundant than any other on the inundated shores of that river. The slender prickly stems, 20 to 25 feet high, spring several together from the same root, and do not merely *seem* to do so, as supposed by Humboldt. I have often seen far more than twelve or fifteen (and I once counted as many as fifty) stems arising from a single root. It is a common Palm on the banks of black-water rivers throughout what is now called the "Canton del Rio Negro," but in Humboldt's time "Misiones del Alto Orinoco." I have seen it, for instance, on the Rio Negro, Uaupés, Pimichin, Pacimoni, and Vasiva. Other prickly species of *Mauritia* grow in the same region, but more frequently in forest-swamps than on river banks, and they have all solitary stems.

Although the identity of Humboldt's Palm is so plain to a person who has seen it in the very place he saw it, yet when we find it entered in the 'Nova Genera &c.' with no further description than "*Mauritia* caudice spinoso," and an added reference to the 'Aspects of Nature,' where nothing more definite is said of it, we may well excuse Dr. Martius for having mistaken a prickly-stemmed *Mauritia* of the Amazon for the *M. aculeata* of Humboldt, although it differs from the latter in the taller, stouter stems, growing singly and not clustered, and in the ovate (not globose) fruits. Mr. Wallace, taking Martius's great work as his guide, and finding his Rio Negro Palm distinct from the "*M. aculeata*" described there, naturally enough considered it altogether new, and named it afresh. His figure is characteristic, and quite suffices to identify the species with Humboldt's; hence it is doubtful whether Wallace's name "*gracilis*," or Humboldt and Bonpland's more ancient name "*aculeata*" should stand. In retaining the latter I have been guided solely by priority; and it entails the necessity of changing the name of Martius's "*aculeata*," which I propose to call "*M. Martiana*." The amended synonymy will stand briefly thus: *Mauritia aculeata*, H. et B. = *M. gracilis*, Wallace, nec *M. aculeata*, Mart.; *M. Martiana*, Spruce = *M. aculeata*, Mart. (nec H. et B.).

M. SUBINERMIS, sp. n.: caudice solitario 18-pedali gracili subinermi; foliis 4-pedalibus flabelliformi-30–34-partitis, laciniis 1¾-pedalibus lineari-lanceolatis acutis subtus albido-pruinosis, aculeolis venarum marginumque nullis; baccis......

Hab. in sylvis humilioribus ad confluentiam fluviorum Casiquiari et Guainia (*S. hb. Palm.* 39). *Cahuáia* Orinocensium.

Caudex 18-pedalis, brachialis, creberrime annulatus, inermis v. aculeis paucissimis semipollicaribus anguste conicis armatus, secus apicem petiolorum basibus fibroso-dissolutis in massam fusiformem congestis investitus.

Folia 4-pedalia; *petiolus* vix 2½-pedalis, diametro 9-lineari, basi ipsa caudicem vaginans, superne subteres, decidue pruinosus; *lamina* flabelliformis profunde 30–34-partita, basi integra 3-pollicari valide plicata, *laciniis* 1¾-pedalibus, latitudine sesquipollicari, lineari-lanceolatis subabrupte acutis, a medio pendulis, triplicatis, subtus albido leprosis pruinosisve.

Spadices parvi (eorum reliquia sola visa).

II. *Orophoma*: floribus polystichis, corollis masculis gamopetalis.

M. (OROPHOMA) CARANA, *Wallace, Palms,* pl. 18: caudice ro-

busto 20–40-pedali inermi sed infra folia mole petiolorum persistentium maxima aucto; foliis magnis haud profunde palmatipartitis.

Hab. in sylvis humilioribus humidis arenosis "Caatingas" dictis per totam regionem flum. Negro a fluvio Tarumá ad flum. Orinoco origines usque (*Wallace, l. c.*; Orophoma Cárana, *Spruce, hb. Palm.* 56). *Caraná* incolarum fl. Negro, nec Paraënsium quæ *M. aculeata*, Mart., est; *Tinámalu* Indorum Barré; *Muhi* Indorum Tucano.

Caudices solitarii 20–40-pedales robusti, inermes, infra coronam frondosam petiolis persistentibus margine fibroso-dissolutis in magnam molem congestis obvelati.

Folia magna flabelliformi-pinnatipartita (minus profunde quam in *M. flexuosa*, teste Wallace).

Spadices inter folia oriundi bipinnati unisexuales (dioici?); *rami* (spadicis ♂) pendulini 14–16-pollicares spiciformes, basi spathella ancipiti 2-pollicari ore dilatato bifida laciniis carinatis (spathellis 2 connatis constante) recepti, dein per totam longitudinem spathellis simplicibus distiche imbricatis vaginati. *Spathellæ* 26–30-jugæ brevicyathiformes, antice bicarinatæ ore ampliato obliquo, postice in linguâm concavam recurvam productæ, striatæ, decidue cinereo-tomentellæ. *Ramuli* spicæve tot quot spathellæ, squarrose distichæ, ½–¼ pollicis longæ (pedicello spathella abscondito excluso), oblongo-cylindraceæ, densifloræ.

Flores ♂ sessiles polystichi cito decidui, bracteolis confertissimis persistentibus squamæformibus calycem subæquantibus, linearibus, oblongis, anguste spathulatis, vel amorphis, et haud raro duabus in unam bifidam coadunatis, dorso alato-carinatis et apice incrassato papillosis stipati. *Calyx* 1½ lin. longus trigono-infundibuliformis ore brevissime trilobus, lobis rotundatis dorso papillosis. *Corolla* duplo et ultra longior hypocraterimorpha v. subinfundibuliformis, tubo tenui calycem superante, limbo e lobis 3 lanceolatis crassis concavis carinatis valvatis extus granulis minutis applanatis tessellatis. *Stamina* 6, corolla inclusa, biseriata, 3 exterioribus brevioribus; *filamenta* corollæ tubo adnata superne libera carnosa subtrigono-prismatica; *antheræ* erectæ oblongæ sagittatæ, loculis basi fere ad medium usque discretis, apice accretis, lateraliter dehiscentibus. *Pistillum* sterile 0.

III. *Lepidocaryum*: floribus distichis.

M. (LEPIDOCARYUM) QUADRIPARTITA, sp. n.: caudice 8–12-pedali diametro semipollicari; foliis 5-pedalibus flabelliformi-4-partitis (raro 5–8-partitis), laciniis lanceolatis ad venas et margines extimos setoso-ciliatis; baccis semipollicaribus oblongis obovatisve ex obtuso cuspidatis, squamulis r ombeis flavidis, apice nigro ciliato loricatis.

Hab. in sylvis humilioribus, in declivibus ad rivulum " Igarapé da Cachoeira" dictum flum. Negro secus ejus ostia affluentem (*S. hb. Palm.* 23).

Caudex 8–12-pedalis, diametro semipollicari, flexuosus, raro erectus, secus apicem basibus petiolorum equitantibus persistentibus obvelatus.

Folia tristicha, 5-pedalia et longiora; *petiolus* 40-pollicaris basi vaginante obtuse carinatus, superne a latere subcompressus, lepra badia decidua vestitus: *lamina* 18–22-pollicaris flabelliformis (angulo basali vix ad 90° metiente) fere ad basin usque bifurca, furcis bipartitis, raro una alterave 3–4-partita; *venæ* 22–28 et furcarum margines setis dissitis subappressis ciliatæ.

Spadices e sinu frondium enati, dioici; *masculi* 17–20-pollicares, bipinnati, decidue leprosi, vaginis (spathellis) bipollicaribus distichis imbricatis sub apice nigro-annulatis ore obliquo extus in acumen carinatum productis tunicati; spathellis infimis paucis vacuis, superioribus omnibus ramum circinato-recurvum simili modo spathellatum ex axilla proferentibus. E cujusque spathellæ rameæ axilla profertur spica brevis scorpioidea flores 20–24, in catervos 5–6 bigeminatim distichos dispositos gerens. *Bracteæ* spathellulæve spicarum distichæ late amplexanti-imbricatæ biflore; *bracteolæ* binatæ perfoliatæ cyathiformes ore valde obliquæ, alato-bicarinatæ, exciso-bifidæ (quaque e bracteolulis 2 in unam coalitis constante), exterior interiorem et flores 2 includens.

Flores ♂: *calyx* cylindraceo-cupularis ore brevissime trilobus. *Corolla* exserta, oblongo-ovalis, e petalis 3 valvatis longe lanceolatis pallide viridibus corneis pluristriatis constans. *Stamina* 6; *filamenta* clavata, basi libera, 3 exteriora breviora; *antheræ* profunde sagittatæ, loculis apice solo accretis sæpe inæquilongis. *Styli* 3 rudimentarii minuti.

Flores ♀ in spicas breviores diversi spadicis congesti......*Baccæ* 7 × 5-lineares oblongæ v. subobovatæ obtusæ sed styli basi persistente acute cuspidatæ, squamulis rhombeis flavidis, medio badiis, apice ciliato nigris loricatæ, monospermæ.

M. (LEPIDOCARYUM) CASIQUIARENSIS, sp. n.: caudice 4–8-pedali, diametro pollicari; foliis 2½-pedalibus flabelliformi-16–20-partitis, laciniis lineari-lanceolatis subobtusis ad venas et margines extimas parce setoso-ciliatis; baccis fere pollicaribus obovatis abrupte cuspidatis, squamulis majusculis oblato-rhomboideis rufis, apice nigrescente fimbriato, loricatis.

Hab. in sylvis fl. Casiquiari, ubi gregarie viget cum *Leopoldinia Piassaba*, Wallace, consociata (*S. hb. Palm.* 40).

Caudices 4–8-pedales, diametro pollicari, erecti inclinative, secus apicem basibus petiolorum integris obtecti.

Folia plura contemporanea, tristicha, 2½-pedalia; *petiolus* subsesquipedalis lepra badia densa subdecidua investitus; *lamina* 15-pollicaris, profunde bifurca, rhachi vix semipollicari, dein flabellatim palmatipartita; *pinnæ* (si ita dicendæ) cujusque furcæ 8–10, totius folii 16–20, lineari-lanceolatæ subobtusæ, basi in flabellam integram 18–24-plicatam sesquipollicarem coalitæ, nitidæ, lævissimæ vel supra ad venam cujusque pinnæ parce setosæ, extimæ solæ cujusque furcæ margine exteriore setoso-ciliatæ.

Spadices ♀ 21-pollicares, bis divisi, ramos primarios sub 4 adscendentes proferentes, per totam longitudinem spathellis distiche vel subtristiche imbricatis bipollicaribus (supremis rameis vix semuncialibus), longe cyathiformibus, ore obliquis et extus in acumen breviusculum productis, antice integris vaginati.

Flores ♀ distichi, spathellulati, cujusque ramuli sub 6. *Bracteæ* spathellulæve distichæ, tot quot flores, compresso-cyathiformes, prælatæ, extus in acumen breve productæ, bracteolam cyathiformem truncatam antice bicarinatam foventes. *Calyx* bracteolam paulo superans, urceolaris, demum ore subtrifidus. *Corolla* exserta 4-linearis, tubo breviter campanulato, limbo trilobo lobis lanceolatis valvatis subpatulis. *Andrœceum* cupulare corollæ tubo arcte adnatum, ore in filamenta 6 ligulata (antheris cassis) fissum. *Ovarium* (teneræ ætatis non vidi); *stylus* brevissimus, stigmatibus 3 subulatis erectis coalitis. *Baccæ* fere pollicem longæ, 7–8 lineas latæ, obovatæ abrupte apiculatæ et stigmatibus persistentibus rostellatæ, squamulis retrorsis in series 18 longitudinales dispositis subimbricatis rufis cartilagineis, apice solo nigrescente membranaceo fimbriatoque, oblato-rhomboideis (1·8 lin. longis, 2·5 lin. latis), sulca verticali exaratis loricatæ, monospermæ.

M. (LEPIDOCARYUM) GUAINIENSIS, sp. n.: priori affinis, caudice tamen gracillimo diametro ⅓-pollicari; foliis vix 3-pedalibus 20-partitis, laciniis angustioribus; baccis multo minoribus anguste obovatis longius cuspidatis, squamulis parvis fere æquilatere rhombeis badiis limbo lato pallido fimbriato semicircumductis loricatis.

Hab. in sylvis fluvii Guainia (*i. e.* fl. Negro supra Casiquiari ostia) (*S. hb. Palm.* 40*. Junio, 1854).

Caudices humiles tenuissimi, ⅓ pollicis diametro, secus apicem petiolorum basibus obtecti.

Folia tristiche imbricata vix 3-pedalia; *petiolus* sesquipedalis et longior badio-leprosus -tomentellusve basi longe vaginatus, vagina antice rupta postice obtuse carinata; *lamina* 16-pollicaris flabelliformis bifurca, *furcæ* basi 11–12-plicatæ dein in pinnas 10 (totius folii 20) longe anguste lineari-lanceolatas, supra ad venam setosas, palmatipartitæ.

Spadices ♀ subsesquipedales secus apicem ramos 3 breves proferentes, spathellis elongato-cyathiformibus ore valde obliquis et in apicem

lanceolatum productis, hinc fissis, ramulum brevem ex axilla proferentibus, vaginati, tomento badio deciduo primum vestiti.

Flores ♀ cujusque ramuli subpauciores quam in priore; *bracteæ* magis obliquæ extus longius acuminatæ; *petala* angustiora; *andrœceum* conforme. *Baccæ* subduplo minores (8×4-lineares) anguste obovoideæ longius apiculatæ rostellatæque, squamulis parvis (11×11 lin., 11×9 lin.) fere æquilatere rhombeis badiis limbo lato pallido membranaceo fimbriato semicinctis loricatæ.

Obs.—Well distinguished from the foregoing by the narrower pinnæ; but especially by *the smaller slenderer fruits* clad *with much smaller and nearly equilateral scales*, which are fringed on all the exposed margin—not much broader than long and fringed merely at the point as they are in *M. Casiquiarensis.*

Appendix, e quatuor *Pandanacearum* descriptionibus constans.

PHYTELEPHAS, *Ruiz et Pavon.*

In proceeding to give some account of the Palms the hard albumen of whose seeds is the substance known in the arts as "Vegetable Ivory," I shall not reopen the question of their place in the system, whether as an outlying genus of the great order of Palmaceæ, or as a genuine member of the allied order Pandanaceæ. If an enlarged view be taken of the latter order, so as to include Cyclanthaceæ within its limits, I do not see how *Phytelephas* can be left out; and then, as Ivory Palms, on the one hand, may seem to trench on the territory of the true Palms, so may Cyclanths, on the other hand, upon that of Arads. But, as new vegetable forms are discovered, to the enrichment of our herbaria, their continual tendency is to narrow or completely obliterate the intervals between closely allied groups, whose definition is thereby rendered more and more difficult at the same time that their affinities are placed beyond dispute; and systematists must be content to "accept the situation."

In ascending the Amazon, it is not until we reach the mouths of the tributary rivers whose remotest sources are in the peaks of the Andes that we find any species of *Phytelephas.* In the eastern roots of the Peruvian and Equatorial Andes two species are tolerably abundant, and in some places cover large plots of ground, under the shade of lofty trees, growing chiefly near streams and on springy hillsides, up to 3000 feet altitude. I first fell in with one of them a little above the mouth of the Napo, whose main sources are in the snowy Antisana and Cotopaxi. This is a small species, fruiting sometimes with no stem at all, although well-grown plants have a slender inclined stem no thicker than the arm, reaching 10 feet high, and spirally areolate with the deep leaf-scars. The fruits are about the size of a child's head, and so much resemble externally the fruits of some Anonas, that the Peruvians call them "Anon de Palma;" but the palm itself is called "Yarína." The thick muricated rind is reddish within, and, although tough, may be eaten, having a flavour of melon or mouldy cheese. The albumen of the unripe seeds is drunk while still watery, or eaten when it becomes fleshy, the taste being something like that of the cocoa-nut in the same immature states; but when quite ripe, it is so hard and ivory-like as to defy the teeth of any animal.

I regret that an accident deprived me of the means of drawing up a botanical description of this species. On my voyage up the Huallaga in May 1855, I gathered one morning some fully formed fruits of Yarina, and, as they were infested by stinging ants, I laid them near the fire, where our breakfast was being cooked, to disperse the ants, and then plunged into the forest in quest of other objects. During my absence the Indians, not knowing I wanted to preserve the fruits, struck their cutlasses into them, and finding the seeds still tender enough to be eaten, munched them all up, and thus destroyed my specimens. I never again saw the Yarina in good condition, except when I and my attendants were already laden with specimens of other plants; and I have preserved no note on the leaves, save that they are equably pinnate and have a long petiole; whereas in the two species I shall have to describe the leaves are pinnate down to the very base, so that there is no proper petiole at all. *By its smaller size, and petiolate leaves,* this species is in fact readily distinguished; and I have no doubt of its being the *Phytelephas microcarpa* very briefly characterized by Ruiz and Pavon (Syst. Veg. 301); for I have traced it a long way up the Huallaga, bearing everywhere the same native name, and the stations given for it by those authors, "in Pozuzo et Pampa-hermosa," are both of them between the rivers Ucayali and Huallaga, Pozuzo being on the small river Pachitea. One of the two Ivory Palms found by Mr. Chandless in the same region, in his late exploration of the river Purus, seems to be the Yarina. I have seen this Palm also northward of the Amazon, on the river Pastasa, and especially on its tributary, the Bombonasa, where it abounds and, in company with a much lofter Palm (*Iriartea ventricosa*), forms little groves with scarcely any admixture of other plants.

The Yarina, as we have seen, descends from the Andes into the plain along the banks of the Amazon for nearly two hundred miles; but there is a second and larger species which begins to appear only at the very roots of the Peruvian Andes, and grows in great abundance all along the eastern side of those mountains up to 3000 feet, or perhaps higher. This is plainly the *P. macrocarpa* of Ruiz and Pavon (Syst. Veg. p. 301); for it agrees with their description, and still bears the same native name as they assign to it, "Pulupuntu" (or "Polo-ponto" in the Hispanicized pronunciation). They found it chiefly on the upper tributaries of the Ucayali, "in Andium nemoribus imis et calidis versus Chanchamayo, Vitoc, Cuchero, et S. Antonium de Playa grande." It is so common along the course of rocky streams in that region, that I know three affluents of the Huallaga which all bear the name "Polo-ponto yacu" (Ivory-Palm river). Mr. Chandless brought good specimens of the fruit from the headwaters of the Purús. At Tarapoto, in Maynas, the Polo-ponto is very frequent, and is even occasionally cultivated for the sake of its fronds, which are the usual material for thatch. I was able there to draw up a nearly complete description of the living plant: it is deficient in the account of the female inflorescence, which I only saw when the fruit was already ripening; and neither in this nor in the following species did I observe any "flores hermaphroditi v. abortu masculi," such as Ruiz and Pavon speak of.

The chief characters of *Phytelephas macrocarpa* are to have *either no trunk at all, or a very short and stout one, which is nearly always inclined or crooked; large leaves equally pinnate to the very base, so that they have no distinct petiole; male flowers (or rather capitula) sessile on a long fleshy compressed spadix, and containing each from* 150 *to nearly* 300 *stamens.* The fruits are from 9 to 12 inches in diameter, nearly spherical, and consist of from twelve to twenty closely packed capitula, each of which is composed of numerous concrete carpels, whereof only about four are fertile. The sharply pyramidal free apices of the carpels are what render the fruits muricated like those of an Anona. The nuts have been long well-known in England.

On crossing over to the western side of the Equatorial Andes, I saw no more of the two species above mentioned, but in their stead a third species very distinct from both, and (so far as I can find) hitherto undescribed. It is known to the natives by the names of "Cádi" and "Corozo"—the latter applied chiefly to the nuts, whose "ivory" has long been in use with the turners of Ecuador. I gave a brief account of the Cadi in a letter to Sir W. J. Hooker, in 1859 (published in the Linn. Journ. vol. iv. p. 186), and I propose now to call it *Phytelephas æquatorialis.* It differs chiefly from the other two species *in the stout and often quite erect trunk, reaching* 15 *or even* 20 *feet in height—in the unequally pinnate leaves, the pinnæ being not equidistant* (*as in the others*) *but aggregate by threes and fours along the rhachis—in the male capitula being stalked or racemed on a pendulous spadix—and in the very numerous stamens, of which each capitulum contains a thousand or more.*

Phytelephas æquatorialis abounds in the Guayaquilian plain, and up the Andine valleys to a height of 5000 feet, especially towards Mount Chimborazo. I should expect to find it extending northward along the coast of the Pacific to within the boundaries of New Granada; but the Ivory-Palm of that country should be a distinct species, if the figure in Seemann's 'Popular History of Palms' has been taken from the true plant; for it represents a stemless Palm with equably pinnate leaves. It is, indeed, within the limits of possibility that several species of *Phytelephas* remain to be discovered on both sides of the Andes, and even in the lands lying northward of the Isthmus of Panamá*.

The characters of the three species may be contrasted as follows:—

1. P. MICROCARPA, *R. et P.*: caudice nullo v. tenui inclinato; foliis æqualiter pinnatis longiuscule petiolatis........*Hab.* in sylvis Peruviæ orientalis, ditione Maynensi, et Æquatorialibus "de Canelos" dictis, præcipue ad flum. Amazonum supra fl. Napo ostia, et in Andibus inferioribus, ubi ad 2500 pedum alt. ascendit.—"Yarina" incolarum.

2. P. MACROCARPA, *R. et P.*: caudice nullo v. perbrevi valido inclinato; foliis æqualiter pinnatis, petiolo subnullo; spadicibus masculis erecto-arcuatis, capitulis sessilibus, staminibus 150–280.—*Hab.*

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* The Ivory-Palm found by Dr. Seemann along the Pacific coast of New Granada, where it is called "Antá," agrees with the Cadi in the male flowers being "attached to fleshy spikes, which are from four to five feet long, and hang down," but differs in the leaves and in the "aerial roots" (such as I have not seen in any *Phytelephas*) which aid to drag the Palm into a recumbent posture, when it "forms a creeping caudex, which is not unfrequently more than twenty feet long" (Voy. of the Herald,' i. 223). The "Tagua" of the Magdalena appears to be another and very distinct species.

cum priore, sed rarius in planitiem descendit et paulo altius supra montes ascendit.—"Pulu-puntu" incolarum.

3. P. ÆQUATORIALIS, sp. n.: caudice robusto sæpius erecto; foliis inæqualiter pinnatis, pinnis 3–4-natim aggregatis, petiolo subnullo; spadicibus masculis pendulis, capitulis pedicellatis, staminibus 1000 et pluribus.—*Hab.* in Andium Æquatorialium devexis occidentalibus usque ad 5000 pedum alt., necnon in planitie Guayaquilensi.—"Cadi" incolarum.

I append descriptions of the two latter species, not complete, but as nearly so as my materials will allow.

2. P. MACROCARPA, *R. et P. Syst. Veg.* 31.

Hab. In Andium Peruvianorum radicibus orientalibus, frequens, raro tamen supra 3000 pedum alt. inventa. Ipse secus fluvios Huallaga et Mayo vidi (*hb. Palm.* 61); Ruiz et Pavon versus fluviorum Huallaga et Ucayali origines "in Andium nemoribus imis et calidis, versus Chanchamayo, Vitoc et S. Antonium de Playa grande;" cl. Chandless secus fl. Purús affluentes superiores (*Journ. Roy. Geog. Soc.* xxxvi. p. 99). "Polo-ponto" vel "Pulu-puntu" a Peruvianis nuncupta.

Caudex vel nullus vel perbrevis et semper inclinatus decumbensve, petiolis decisis spiraliter areolatus v. eorum reliquiis horridus.

Folia polysticha conferta æqualiter pinnata; *petiolus* præter rhachis basim dilatatam vix ullus; *pinnæ* circiter 100-jugæ, pleræque exacte oppositæ, basi reduplicatæ, lineari-lanceolatæ sensim acutatæ rectæ plicatæ glaberrimæ, mediæ 32 × 1½-pollicares, apicales vix bipedales.

Spadices dioici, ex axillis foliorum annotinorum oriundi; *masculi* adscendentes spiciformes 32-pollicares; *pedunculus* compressus 10 pollices longus, 14 lineas latus, 8 lineas crassus; *rhachis* 22 × 2¼ × 1¼-pollicaris, floribus (capitulis melius dictis) sessilibus onusta. *Capitula* polyandra, inferiora majora subdissita elongata subrectangularia, superiora arcte congesta fere æquilatere 4–6-gona, perigonio (bractea spathellave) annulari lineam alto ore subobliquo et 4–6-angulato circumcincta. *Stamina* cujusque capituli 150–280, supra torum elevatum congesta, albida, odorata; *filamenta* teretia attenuata 3½ lin. longa; *antheræ* 2 lineas longæ, lineares, connectivo in unguiculum producto, loculis secus longitudinem rimosis. *Spathæ* 2, fulvæ, glabratæ: exterior 7 × 2-pollicaris elongato-oblonga compressula ancipiti-bialata, apice labiis 2 abrupte apiculatis hians; interior 10 × 2-pollicaris lineari-fusiformis apice obtuso ancipiti, demum antice rimosa.

Spadicis fœminei pedunculus longitudine masculi, paulo crassior, apice in receptaculum ovale compressum dilatatus et capitulis 12–20 sessilibus congestis onustus. *Involucra* squamis pluribus parvis subtriangularibus tempore fructus apice fibroso-solutis capitulorum basim cingentibus constantia. *Ovaria* plurima, coalita, apice solo pyramidato subacuminato plerumque obliquo striato libera, perigonio stricte induta, uniovulata, pauca centralia (sub 4) fertilia, lateralia sterilia constricta fere mutica apiceque areolas parum elevatas efformantia. *Stylus* filiformis basi crassior, 2-pollicaris; *stigmata* 5 v. 6 bipollicaria anguste loriformia, margine interno tuberculosa. *Spatharum* reliquia sola vidi.

Fructus massam globosam, diametro 9–12-pollicari efformantes; *capitula* matura (sorosi) pressione mutua 4–6-angulari-obpyramidata, apice convexa et ovariorum apicibus muricata, nuces sub 4 complectentia; exocarpio (perigoniis coalitis constante) e carnoso lignescente, extus cinereo, intus aurantiaco investita. *Nuces* demum a matrice solutæ, basi stipite brevissimo ad mamillam subovoideam redacto suffultæ, albidæ, crasse dolabriformes v. forma fere sphæræ quadrantis, angulo axiali vix 90°, 21 lineas longæ, 16 lineas latæ. *Pericarpium* tenuiusculum fragile, membranis tribus constans, externa albida, media nigrescente, interna (endocarpio) fusca primitus mediantibus raphes vasis cum testa tenui fusca concreta. *Semen* forma nucis, erectum, prope hilum mamilla embryonem obtegente instructum. *Albumen* album osseum durissimum. *Embryo* hilo proximus, conicocylindraceus, forma directioneque eidem Palmarum plurimarum omnino conformis.

3. P. ÆQUATORIALIS, sp. n.

Hab. in sylvis reipublicæ Æquatoris (Ecuador), nempe in planitie Guayaquilensi et in Andium radicibus occidentalibus usque ad 5000 pedum alt., frequens, nominibus "Cádi" et "Corozo" cognita. Eadem species verisimiliter etiam per oras maris Pacifici usque ad Panamá extenditur (*S. hb. Palm.* 64; *Linn. Journ.* iv. 186).

Caudex 15–20-pedalis validus sæpius erectus raro arcuatus inclinatusve petiolorum cicatricibus spiraliter areolatus.

Folia 30-pedalia late arcuata inæqualiter pinnata; *petiolus* perbrevis basi dilatatus incrassatusque; *pinnæ* 3–4-natim fastigiatæ, vix bipedales, subrectæ, lineari-lanceolatæ, sensim acutæ, glaberrimæ.

Spadices masculi 4–4½-pedales, simplices, arcuato-penduli. *Pedunculus* 18×2×¾-pollicaris, et *rhachis* (1½ poll. lata) compressa. *Spathæ* 2: *exterior* 13×5-pollicaris, canescens olivaceave, rectangulari-oblonga, fere a basi ad apicem semiovalem usque æquilata, ancipiti-bialata, antice rimosa; *interior* bipedalis, circumferentia 8-pollicaris, ochraceominiata, coriacea, exteriore crassior, anguste fusiformis, basi constricta pedunculum vaginans, apice solo argute anceps demum antice fissa. *Capitula* circiter 170, racemosa polysticha globosa exinvolucrata, pedicello 2-3-pollicari, albido, 4-sulco, basi unibracteato, a basi ad apicem usque sensim attenuato, angulo 50° v. majore adscendente suffulta. *Bracteæ* parvæ tenues lato-ovatæ apiculatæ, inferiores sæpe inæquilateræ et longius cuspidatæ, infima vacua. *Stamina* mille et plura, densissime conferta, alba, subsemipollicaria; *filamenta* 3½

lineas longa, filiformia, flexuosa; *antheræ* 2½ lineas longæ, lineares, unguiculatæ, flexuosæ, loculis sæpe inæquilongis connectivo lateraliter adnatis longitudinaliter dehiscentibus; *pollinia* trigono-prismatica.

Spadices fœmineos examinare non potui.

CARLUDOVICA, *Ruiz et Pavon.*

I gathered a few plants of this genus; but the dried specimens have been mostly mutilated by insects, and are scarcely worth describing. The bifid-leaved species are tolerably abundant, from the mouth of the Amazon all the way up to the Andes, sometimes climbing high up the trees, like epiphytal Arads, and sending down long aerial roots which are ready-made ropes; while other species are terrestrial and stemless. But my object in introducing the genus here is to say a few words about the Carludovica, from whose fan-shaped leaves what are called "Panamá hats" are made, the chief sites of the manufacture being, not at Panamá, but along the western foot of the Andes and adjacent sea-coast, from the Equator to lat. 6° S., and at the eastern foot of the same mountains between the parallels of 5° and 8° south. The plant itself grows wild all along the eastern side of the Andes of Ecuador and Peru up to perhaps 4000 feet, and descends into the great plain, along the course of the Amazon, to beyond the Brazilian frontier, where I first saw it near the mouth of the Yauarí. Throughout this region it is known by the native name of "Bombonaje."

Between the western base of the Equatorial or Quitenian Andes and the shores of the Pacific the same species is largely cultivated, and is probably wild towards the sources of some of the streams. There it is called "Toquilla," the straw prepared from it being known as "Paja de Toquilla," and the hats as "Sombreros de Toquilla," or more commonly "Sombreros de paja" (straw hats)*.

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* "Toquilla" is a pure Spanish word, the diminutive of "toca," *a woman's cap*. It also means *a hat-band*—"cierto adorno de gasa, cinta ú otra cosa que se ponia al rededor de la copa del sombrero." (*Diccionario de la Academia.*) Possibly only women's hats were at first woven of this material. At the present day the hats are worn, of one and the same shape, by both men and women of the native and mixed races, and even by *white* ladies in journeys on horseback.

In the market of Guayaquil the hats are often classed according to the town or district where they have been fabricated, thus: "Sombreros de Monte Cristo," As this plant has always passed in Europe for the *Carludovica palmata* of Ruiz and Pavon (Syst. Veg. 291; Kunth, Enum. iii. 105), I supposed it already so well known, and so common in herbaria, that I needed not include specimens in my sets; and I accordingly dried only a couple of leaves as objects of curiosity. But on comparing my notes and specimens with the brief description given by Ruiz and Pavon of their *C. palmata* and of its uses, I see reason for considering it a quite distinct species from the Toquilla. I will first sketch the leaves of the latter and the mode of preparing the "straw," and then return to the true *C. palmata*.

CARLUDOVICA, sp. = *Bombonáje* Peruvianorum = *Toquilla* Æquatorialium (*S. hb. Palm.* 83, folia in sylvis Andium Maynensium prope Tarapoto lecta).

Caudex nullus. *Folia* plurima, radicalia, glaberrima; *petiolus* tenuis elongatus; *lamina* flabelliformis 4-partita, angulo basali cujusque laciniæ 40° vel totius folii 160°; *laciniis* 21-pollicaribus, ab apice ultra tertiam partem 10-fidis, lacinulis ergo totius folii 40, 8 pollices longis, late subulatis, venis primariis plicisque tot quot lacinulis.

The leaves are folded in vernation exactly like a fan, each segment on its own medial vein or rib, so as to consist of eighty layers. It is only these young unexpanded leaves that are used in weaving hats. With a small two-pronged fork, or with two needles stuck into the end of a stick, the whole eighty layers are split up at once into 160 strips, leaving out the midribs, which are then bent back and cut away, while the strips remain hanging from the top of the petiole broom-fashion. They are next boiled until they become white, and, having been carefully combed out with the fingers, are hung in the sun to dry. They curl in at the edges in drying, but do not twist in the least; so that from being $\frac{1}{5}$th or $\frac{1}{4}$th of an inch in width when fresh, they are only $\frac{1}{20}$th of an inch or less when dry, and are nearly terete, but get flattened in weaving. For the finest hats, only a single narrow strip is taken from the margin of each segment, leaving a great breadth to be thrown away with the midribs; such strips dry to no more than $\frac{1}{40}$th or $\frac{1}{30}$th of an inch broad.

Now Ruiz and Pavon describe their *Carludovica palmata* as

"de Jipijapa," "de la Punta de Santa Elena." The hats last named, usually styled "Sombreros de la Punta" or "Punteños," were in most request when I was at Guayaquil in 1860–3.

having "folia flabelliformia 3–5-partita," and say nothing about the segments being again numerously cloven; but if the leaves had been 40-cleft (as in our plant) they would surely have so described them. And while they make no mention of hats being made from the leaves, they say that the Indians thatch their houses with them, and that the petioles (6 feet long) serve for walking-canes*. But although the leaves may serve for thatch, the petioles of the Toquilla are far too weak for walking-canes, and I never saw them more than half 6 feet long. There is, however, a much larger species of *Carludovica* in Maynas, which corresponds both in character and uses with the *C. palmata* of Ruiz and Pavon. It is called "Irapái;" and the palmatipartite leaves are much used for thatch in the villages of the Upper Amazon, whereof I saw a fine example in the old church of San Regis, a little below the mouth of the Tigre; but they are not at all used for hats. Unfortunately I never saw fresh specimens, so that I can give no description of it†.

This is all I have to offer on the question of the identity of *Carludovica palmata*, R. et P. Future investigators, with adequate materials, will be able to decide it.

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* "Incolæ e stipitibus orgyalibus teretibus baculos leves et flexiles conficiunt. Indi hujus speciei et sequentium frondibus tuguria tegunt."—*Syst. Veg. l. c.*

† In the Forest of Canelos, on the banks of the Bombonasa, I saw growing along with the Bombonaje, a third fan-leaved species of *Carludovica*, foliis parvis flabelliformibus bi- (nec quadri)partitis apice multifidis.

Remarks on the Generic Name *Cascarilla*. By H. A. WEDDELL, M.D., F.M.L.S., &c. From a letter addressed to J. E. HOWARD, Esq.

[Read March 4, 1869.]

HAVING had of late many opportunities of appreciating the advantages of the Code of Laws recommended by the Botanical Congress of 1867, I thought I would, while dealing with cases of priority, examine more closely than I had hitherto done a question to which you have frequently called the attention of botanists. I allude to the expediency of maintaining or rejecting the name of *Cascarilla*, given to a genus of cinchonaceous plants, and closely allied, but, in my opinion, still clearly distinct from, *Cinchona* *. The conclusion I have come to is that the name of *Cascarilla* must give way to that of *Buena* (Pohl), its elder—and not, as many have thought, to *Ladenbergia* (Klotzsch), which is of earlier date.

Were the disputed point to be merely between *Cascarilla* and *Ladenbergia*, the first name would needs have to be maintained, as there is no sufficient reason for rejecting it (*vide* 'Laws of Nomenclature,' art. 58 and 59)†.

The name of *Buena* was given by Pohl to a Brazilian tree, *B. hexandra*, discovered by him in the province of Rio de Janeiro. It is the only species he has described of the genus, and has since become one of Klotzsch's *Ladenbergiæ* and of my *Cascarillæ*.

Klotzsch, moreover, gave the name of *Buena* to the first section of his genus *Ladenbergia*, that of *Cascarilla* being applied to the second, the reason for which he did not adopt it as a generic name, instead of creating a new one, being very probably the same that led me to leave it equally aside for that of *Cascarilla*, namely the confusion existing between it and *Cosmibuena* of Ruiz and Pavon. On reflection, however, such an error, even when countenanced by Pohl himself, cannot stand against fact; and the fact is that *Buena* (typified in *B. hexandra*) and *Cosmibuena* of Ruiz and Pavon are widely distinct, the lobes of the corolla, for instance, being strictly valvate in the flower-bud of the first, while in that of the second they are contorted, &c.

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* Nevertheless, if it were clearly shown that there is such a thing as *Cinchona* with capsules dehiscing indifferently from base upwards and *vice versâ*, my confidence in these genera would be somewhat shaken; but I must say that I am not at present sufficiently convinced that the double dehiscence described by M. Karsten, as characteristic of his *Cinchona heterocarpa*, is an entirely natural one. I mentioned a similar occurrence as having taken place in a specimen of *C. lucumæfolia*, but I looked upon it as a mere *post mortem* accident.

† Art. 58. When a Tribe is made into an Order, when a subgenus or a section becomes a genus, or a division of a species becomes a species, or *vice versâ*, the old names are maintained, provided the result be not the existence of two genera of the same name in the vegetable kingdom, &c.

Art. 59. Nobody is authorized to change a name because it is badly chosen or disagreeable or another is preferable or better known, or for any other motive either contestable or of little import.

According to law, then, the name of *Buena* must supersede that of *Cascarilla*; and I propose, in consequence, that all the species I have described under the head of *Cascarilla* shall be henceforward ranked under that of *Buena*, as in the subjoined list.

BUENA, *Pohl, Pl. Bras*, t. 8. *non Cav.*

Cinchona b. Cascarilla, *Endl. Gen. Pl.* p. 556.—Ladenbergia, *Klotzsch in Hayne's Arzneig.* 14, *in adnot. ad* t. 15, *exclus. spec.*—Cascarilla, *Wedd. in Ann. Sc. Nat.* 3e sér. x. p. 10; *Hist. Nat. Quinq.* p. 77.—Cinchona, Sect. III. Ladenbergia, *Karst.*—Cinchonæ spec. *Auct.*

I. CASCARILLA, *Endl.* (PSEUDOQUINA, *Wedd.*).

1. B. MAGNIFOLIA. Cinch. magnifolia, *Ruiz et Pav.*; Cinch. oblongifolia, *Mutis*; Ladenb. magnifolia, *Klotzsch*; Casc. magnifolia, *Wedd.*

2. B. NITIDA. Cinch. nitida, *Benth.*; Ladenb. nitida, *Klotzsch*; Casc. nitida, *Wedd.*

3. B. STENOCARPA. Cinch. stenocarpa, *Lamb.*; Casc. stenocarpa, *Wedd.*

4. B. ACUTIFOLIA. Cinch. acutifolia, *Ruiz et Pav.*; Ladenb. acutifolia, *Klotzsch*; Casc. acutifolia, *Wedd.*

5. B. RIVEROANA. Cinch. oblongifolia, *Lamb. non Mutis*; Casc. oblongifolia, *Wedd.*

II. EUBUENA (Buena, *Klotzsch*; Carua, *Wedd.*).

6. B. HEXANDRA (*Pohl, Pl. Bras.* t. 8). Ladenb. hexandra, *Klotzsch*; Casc. hexandra, *Wedd.*

7. B. RIEDELIANA. Cinch. Riedeliana, *Casaretto*; Ladenb. Riedeliana, *Klotzsch*; Casc. Riedeliana, *Wedd.*

8. B. HETEROPHYLLA. Casc. heterophylla, *Wedd.*

9. B. PAVONII. Cinch. Pavonii, *Don*; Ladenb. cava, *Klotzsch*; Casc. Pavonii, *Wedd.*

10. B. LAMBERTIANA! Cinch. Lambertiana, *Mart.*; Ladenb. Lambertiana, *Klotzsch*; Casc. Lambertiana, *Wedd.*

11. B. GAUDICHAUDIANA. Casc. Gaudichaudiana, *Wedd.*

12. B. CITRIFOLIA. Casc. citrifolia, *Wedd.*

13. B. CALYCINA. Casc. calycina, *Wedd.*

14. B. BULLATA. Casc. bullata, *Wedd.*

15. B. UNDATA. Ladenb. (Buena) undata, *Klotzsch*; Casc. undata, *Wedd.*; Cinch. undata, *Karst.*

16. B. CARUA. Casc. Carua, *Wedd.*

17. B. RORAIMÆ. Cinch. Roraimæ, *Benth.*; Ladenb. Roraimæ, *Klotzsch*; Casc. Roraimæ, *Wedd.*

III. CALYPTRIA.

18. B. MACROCARPA. Cinch. macrocarpa, *Vahl*; Cinch. ovalifolia, *Mutis*; Ladenb. macrocarpa, *Klotzsch*; Casc. macrocarpa, *Wedd.*

19. B. CRASSIFOLIA. Cinch. crassifolia, *Pav. DC.*; Casc. calyptrata, *Wedd.*

IV. MUZONIA.

20. B. MUZONENSIS. Cinch. muzonensis, *Goudot*; Casc. muzonensis, *Wedd.*

21. B. HOOKERIANA. Casc. Hookeriana, *Wedd.*

As a matter of course, to this list will have to be added the species since described by Karsten and others as consequences of the above, whether under the head of *Cinchona* or under that of *Ladenbergia*, the latter name being maintained, as formerly proposed by me, for *Cinchona dichotoma*, Ruiz and Pavon, and its congeners.

Letter from Dr. CUNNINGHAM, Naturalist to H.M.S. 'Nassau,' surveying the Strait of Magellan, to Dr. HOOKER, F.R.S.

[Read May 6, 1869.]

H.M.S. 'Nassau,'
Western part of the Strait of Magellan,
January 1, 1869.

MY DEAR SIR,—We expect to reach Sandy Point in a few days to get a supply of provisions; and as we shall leave letters at the settlement to be forwarded to England by a steamer which passes through the Strait in the course of this month, I make use of the opportunity to send you a few notes of our proceedings during the last two months. We left the Bay of Valparaiso on the evening of the 3rd of November, and reached Lota two days later. The surrounding country was looking exceedingly green and pretty, very refreshing to the eye after the daily contemplation of the parched brownish-green hills at the back of Valparaiso. Here our stay lasted for a day and a half; and the first day Capt. Mayne and I enjoyed a long ride into the country, which was beautifully diversified with trees and shrubs, *Boldoa fragrans* being especially plentiful among the latter, and its leaves presenting a most agreeable variety of shades of green. A considerable number of plants were in flower, the greater number of which I had, however, previously observed in the neighbourhood of Valparaiso. Such were the *Pasithea cærulea,* an *Oxalis,* various species of *Œnothera,* the little scarlet *Tropæolum,* &c.; but I also met with some novelties, such as *Bomarea Salsilla,* which presents a very handsome appearance, trailing over the shrubs, and the Chilian Strawberry, which was in full flower. The forenoon of the following day I principally employed in searching the beach for marine animals, but did not meet with anything that had not occurred to me on my former visit. In the afternoon we got under weigh with the idea of continuing our voyage, but before we had gone far found the wind so much against us that we anchored in Luco Bay, one of the subdivisions of the large Bay of Arauco. Here we spent three very pleasant days, enjoying the fine sunny weather and the pretty hilly country. I saw some very beautiful trees of the Roble (*Fagus obliqua*), which appears to be rapidly undergoing extinction in the northern provinces of Chili, and I obtained a considerable number of flowering plants, a good many of which were new to me, as, for example, an *Embothrium,* which has much narrower leaves than *E. coccineum,* a blue *Sorema* (?), an orange *Linum,* a species of *Libertia,* &c. Here and there curious tumuli were to be seen, and I made what inquiries I could about them. I met a very intelligent Scotchman, who was wrecked in the Bay thirty years ago, and has been there ever since; and he told me that nothing, so far as he was aware, was known as to their age, beyond the fact that they must be of very considerable antiquity, as the Araucanian Indians have no traditions respecting them. He informed me that nothing, so far as he was aware, had ever been got in the interior of them; and I had one of them opened to a considerable depth, but with no results. None of the tumuli that I saw were above 5 or 6 feet high; but I was told there were some at a distance 40 feet in height. Of the terrestrial animals that I procured, I may specify a small snake and a great longicorn beetle. The dredge yielded a few specimens of a crustacean genus, *Serolis*. These I have not examined sufficiently carefully to say whether they are distinct from the *S. Fabricii* of the Straits. The rocks yielded specimens of a small and active *Sepia*, *Concholepades*, *Fissurellæ*, *Patellæ*, a curious Ascidian which the Chilians term "piiure" and esteem as a delicacy (it likewise occurs at Chiloë), and some incrusting sponges. We had two seining parties, and caught a considerable number of fish, among which were Torpedos, which gave most distinct galvanic shocks, *Callorhynchi*, and a very curious little fish of the *Gymnetrus* family, as well as some large swimming crabs. We left our anchorage on the 11th and reached the Bay of San Carlos, Chiloë, on the morning of the 14th, which was a most dismal one of drizzling rain, and suggested forebodings that we had left the region of fine weather behind us. However, by the middle of the day it cleared up, and, wonderful to say, we had fine weather during the rest of our stay. The land did not look quite so green as it did when we first arrived at Chiloë last season, owing chiefly to the young foliage of the shrubs (particularly the *Myrtaceæ*) being of a reddish-brown colour. The Fuchsias and Escallonias were just beginning to make a show, and daily grew handsomer; and a Malvaceous shrub was in great glory, covered with large white and delicate pale purple flowers. Our own Foxglove (*Digitalis*) was also flowering luxuriantly; and I was much delighted with a splendid yellow *Calceolaria* which grew on the cliffs close to the beach. *Sarmienta repens* and *Callixene polyphylla*, both in full flower, adorned the stems of many of the trees; and among the other plants obtained were an *Uncinia* (probably *U. multifaria*), two white-flowered species of *Libertia*, *Berberis Darwinii*, and *B. dulcis*, *Codonorchis Lessonii*, which I had previously obtained in the Strait, *Embothrium coccineum*, *Lomatia ferruginea*, and, last though not least, the *Tricuspidaria*, the low trees of which were loaded with the drooping rose-coloured flowers. By the way, I see that in an article by Mr. Miers on the *Tricuspidariæ*, in the July number of the 'Annals of Natural History,' he describes the flowers of what I suppose to be this species as "aurantiaci."

With the exception of some very fine specimens of a species of *Pholas*, I did not obtain anything worth mentioning in the way of marine animals. We were much interested in watching the flight of large flocks of that curious diving Petrel the *Pelecanoides Berardi*, of whose habits Mr. Darwin has given such an excellent account in his narrative. We left the Bay of San Carlos on the 20th, and went on our way south between Chiloë and the mainland, and we arrived at the island of Quehuy, not far from the southern extremity of Chiloë, on the 21st. There we remained a day and a half; and Capt. Mayne engaged an Englishman to act as our pilot through the Chonos archipelago, which we were desirous of seeing something of. Quehuy is a pretty wooded island, with a considerable population, a goodly proportion of whom are Indians speaking the Huilliche language. On the steep sandstone cliffs above the beach, in some places, I got magnificent specimens of the yellow *Calceolaria* I have already mentioned; and *Gunnera scabra* was a striking object, with its great rhubarb-like leaves and curious flower-spikes; and in the weeds I found a species of *Luzuriaga* in great profusion climbing the tree-trunks, its glossy green leaves, snow-white flowers, and bright orange berries producing a most attractive effect. There were also some splendid trees of *Embothrium*; and I found two species of *Solanum*, one forming a stout shrub.

January 14th.—I resume my narrative after a considerable interval. We left Quehuy on the morning of the 23rd, and pursued our way south. It was a splendid day, and the scenery of the mainland was extremely fine, the Minchin Madira, Corcovado, and Milimoya mountains attracting special attention by their snowy-mantled and sharp peaks. In the evening we reached Port Melinka, in the Guayteras group of islands; and as we had a few hours' daylight, a party of us went in search of a small cave which, we were told, was on one of the islands; and contained bones of Chonos Indians, which I was naturally anxious to secure. After a careful scrutiny of the coast of the said island, I am happy to say that our endeavours were crowned with success; for we found the cave, and in it I obtained crania and some other bones. I collected a sample of the plants, nearly all of which I had previously met with in Chiloë. I think the only novelty was a very handsome species of *Lathyrus*, perhaps *L. pubescens*. This was the southernmost locality in which I observed *Sarmienta* *repens*. Next morning we went on our way, and in the evening arrived at Port Nevada, about a third of the way down the Chonos group.

This day, which was tolerably fine, we had excellent opportunities of observing in what a very vague manner the archipelago is laid down in the maps and charts hitherto published; for, instead of consisting of a few large islands, as commonly represented, it is formed of myriads of small ones. We reached Port Laguna about ten miles north of the Darwin Channel by noon on the 25th, and there remained for the rest of the day, which allowed me an opportunity of exploring the neighbourhood. Some others were seen, and we picked up some skulls of the Coypou (*Myopotamus*).

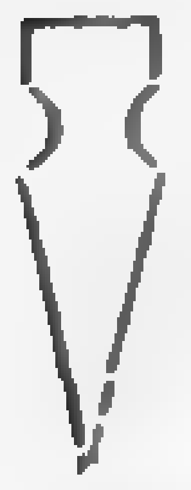
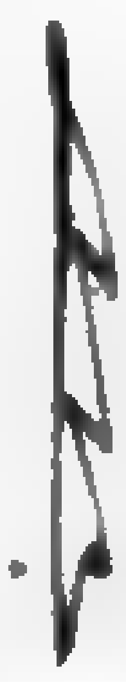
Some specimens of the *Chloëphaga poliocephala* were shot. This very beautiful goose we have met with in many localities in the channels and western part of the Strait of Magellan, where the Upland Goose (*C. magellanica*), so common in the eastern part of the Strait and Falkland Islands, is very scarce. The vegetation of Port Laguna was intermediate in its character between that of Chiloë and the Channels: *Podocarpus nubigenus*, *Metrosideros stipularis*, *Embothrium coccineum*, *Lomatia ferruginea*, *Pernettya mucronata*, *Philesia buxifolia*, *Desfontainia spinosa*, *Tecoma valdiviana*, *Berberis dulcis*, and a low tree which I first met with last year at Playa Parda, and which I have since found to extend throughout the Channels, and as far north as Chiloë, and which appears to be a species of *Panax*, were amongst the prevailing plants. The *Chusquæa*, so abundant in Chiloë, *Escallonia macrantha*, and *Berberis Darwinii* were met with for the last time. On the tree-trunks I obtained some beautiful flowering specimens of *Callixene polyphylla*, as well as examples of the Gesneraceous creeper I found last year at Port Otway, and which, I suppose, is a species of *Columnea*. *Mitraria coccinea* was in fine flower; but, as one of my last years' letters will have informed you, this is by no means its southernmost habitat.

Next day we parted with our pilot, and passed through the Darwin Channel into the open sea, a circumstance which did not add to our comfort, as we encountered a very heavy swell, which caused the 'Nassau' to go through a series of the most wonderful evolutions.

We entered the Messier Channel early on the afternoon of the

27th, and found things in general looking very much as when we left them, heavy rain falling, and the tops of the mountains shrouded in mist. That evening we anchored in a small cove which bears the name of one of the surveyors, and there we remained all the next day, as it rained hard, with the addition of furious squalls, which made us feel thankful that we were comfortably at anchor. On the 29th we weighed in the morning and passed southwards as far as Gray Harbour, a little to the north of the English Narrows. There we remained for a day to complete the survey of the harbour; and, as usual, I explored the neighbourhood with my friend Dr. Campbell and some of the other officers. We got beautiful specimens of *Escallonia serrata* in flower, as well as excellent specimens of *Pinguicula antarctica*, and that curious dwarf Conifer the *Lepidothamnium*, which I first found at Eden Harbour last year, and which ranges throughout the greater portion of the Channels without, so far as I have yet seen, reaching the Strait of Magellan. We also obtained numerous specimens of a species of *Lymnæa*, which was living in company with *Balani* in brackish water. The shells varied much in form, the apices of some being much eroded.

From Gray Harbour we went to Port Grappler; and the night we got there a beautiful fish, resembling a *Callionymus* in its general form, was taken on a line by one of the ship's company, and, as is usually the case with anything curious, presented to me. Next day a party of us went up to the head of the harbour; and there I made what I hope is rather an important discovery. When walking over a patch of open marshy ground, my attention was arrested by the small leaves of a creeping plant which I had never seen before; and it immediately occurred to me that this was probably King's Port-Famine plant, of which you sent me a scrap about eighteen months ago. After a careful search of the ground on my hands and knees, I found first last year's fruit, then flower-buds, and then flowers in abundance. I have carefully compared my specimens with your fragment, and feel little doubt that the two plants are the same. The leaves of both agree in general arrangement and form, and are both minutely denticulated at the top. My plant grows with the habit and exactly in the same situation where you thought it might be found, *i.e.* creeping, like an *Epilobium*, on marshy ground. I made careful sketches of the flower at the time, which I send you, as well as a fragment of the plant, which I hope will supply the deficiencies of my drawings and descriptions *. Port Grappler is the only locality where I have yet seen this plant, though I have diligently searched for it in all the localities visited since then. I spent some hours hunting for it in the marshes of Port Famine, but without success. I hope it may be the plant you wish for.

The next locality which I had an opportunity of examining was Puerto Bueno, where we spent a week, experiencing very bad weather, which greatly hindered work. There is much open ground here; and *Astelia, Gaimardia*, and *Tetroncium* were in full flower in the marshes. Though I have now found *Caltha appendiculata* and *C. dioneæfolia* in many localities, I have never got either species in flower. On the pools of water *Rostkovia* was very plentiful, growing in curious rectangular lines. I met with the pretty little *Oxalis magellanica* for the first time, and noticed *Lomatia ferruginea* for the last. Here it forms a miserable stunted shrub not two feet high. The climate and vegetation of the channels are thoroughly Fuegian; and I was therefore greatly interested by obtaining in this cold damp region three species of Batrachia (two Toads and a Frog). You may perhaps remember that Mr. Darwin comments on the total absence of Reptiles and Amphibia from Fuegia; so that the discovery of Lizards in the eastern part of Fuegia and Amphibia in the southern part of the channels are facts worth notice. We got several specimens of a handsome beetle of the family *Carabidæ*, and by the dredge a species of *Gabathea* (which I am informed by Mr. Spence Bate is probably *G. monodon*, and which occurs throughout the strait). We left Puerto Bueno on the 14th, and after spending a night at Columbine Cove went on to Fortune Bay, where we remained for some days. Here we were visited by a number of Canoe Indians, including a party we met last season, who evidently recognized us as old acquaintances. They inhabited three canoes and an old merchant-ship's boat. One forenoon we had between thirty and forty on board. They brought shell and bone necklaces, bows and arrows, with quivers of otter skin, spears, and slings to barter for tobacco, ship-biscuit, and knives; and it is worthy of remark that as yet they do not appear to have acquired a taste for intoxicating liquors. The arrow-heads were formed most ingeniously of green bottle-glass. I should much like to see them manufactured; for I do not understand how they are chipped into the required form. The spears are of two forms. The handles of both kinds are formed of tapering poles about eight feet long, and the heads are apparently fashioned out of the bones of Cetacea. One is shaped thus , and is apparently employed for harpooning porpoises. It is attached by a thong to the spear-handle in such a manner that, when the Cetacean is struck, it becomes detached and leaves the handle floating on the water. The other spear-head is, on the other hand, invariably fixed to the handle, and seems to be employed in the capture of Otters. It is barbed in this manner . The Indians were most indiscriminate in their desires for what they saw, making signs for our caps, handkerchiefs, watch-chains, &c. (One individual, doubtless of a literary turn of mind, wished to possess himself of Darwin on Domesticated Animals and Plants, which I happened to have in my hand!) They laughed and talked a great deal, and favoured us with what we supposed to be national melodies. A small mirror displayed to them excited much astonishment and a certain amount of consternation. On leaving the ship they established themselves on an old camping-place, roofing in some old wigwams, and building a new one. At Fortune Bay I procured several species of fish that were new to me, and I found *Senecio trifurcatus* for the first time in flower. I see you remark in the 'Flora Antarctica' that the pale colour of the flower seems to have deceived the older authors with regard to the genus of the plant; but in the Plate, doubtless by inadvertence, the entire flower is coloured *pale yellow*. Now all the specimens I have yet met with (and I have found the plant in numerous localities, growing on the mountain-sides in company with *Clarionæa magellanica*) have a yellow disk, but a *snow-white* ray.

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* The calyx is 5-partite. The corolla contorted in æstivation, formed of five distinct white petals, tinged with yellow at the base. The stamens 5; anthers 2-lobed, extrorse, yellow. Ovary superior, in some flowers green, in others dull purple. Cells, three, many-seeded. Placentation central. Fruit a capsule, opening by three valves. Seeds brownish-black, shining, remaining attached to the central seed-stalk after the valves of the capsules have fallen off. Leaves spathulate, toothed at the apex, closely aggregated, so as frequently to form a sort of rosette around the flower. The plant creeps along the mossy ground, sometimes covering an extent of more than 2 feet in length, and emitting rootlets; the branches from 4 to 8 inches long.

At Fortune Bay, as in many other localities, I got beautiful flowering specimens of *Lebetanthus americanus*. Apparently this elegant and delightfully fragrant plant flowers early in the season; for last year I did not meet with it in flower though it is so common. Our next anchorage was the Otter Islands, where we spent a couple of days, and I found *Veronica elliptica* in flower, for the first time. From the muddy bottom of the harbour I obtained some fine specimens of a bivalve mollusk of the genus *Leda* by means of the dredge; and the kelp yielded me a few Mollusca and Crustacea that I had not got before. We reached Sholl Bay on the evening of the 21st, and took advantage of the following day, which was a fine one, to cross the strait to the Fuegian side. As we approached the southern shore of the strait we all agreed that it well merited Narborough's name of Island of Desolation; for it was by far the wildest and dreariest-looking piece of country we had yet seen—a barrier of bare grey crags and jagged mountain-tops rising sheer out of the water. We had a fine view of Cape Pillar; and after scrutinizing Tuesday Bay, the Harbour of Mercy, and Skyring Harbour, we anchored in Tuesday Bay, and remained for three days, spending our Christmas there. I found the vegetation exactly the same as that of the southern Channels—Winter's Bark, *Libocedrus, Desfontainea, Berberis ilicifolia, Fagus betuloides, Pernettya mucronata,* and great bushes of *Veronica decussata* in flower. *Escallonia serrata* was plentiful and in full flower, the plants looking in the distance as if sprinkled with snow. You will, I think, be interested to hear that *Metrosideros stipularis* was common here and in several other places that I visited on the southern shore of the Strait, so that it has a much wider range than was at one time supposed. It occurs throughout the entire tract of the Channels and in the Strait as far east as Playa Parda at all events. In Tuesday Bay I found the pretty little *Ourisia breviflora* for the first time; but my specimens are not nearly so finely coloured as those in the 'Flora Antarctica.' On leaving Tuesday Bay we visited a considerable number of places, both on the Patagonian and Fuegian sides of the Strait; and I got a few additions to my collection, though nothing of much importance. I found *Lagenophora Commersonii* for the first time in flower in a new harbour we found in Fuegia, and in another Fuegian harbour excellent specimens of *Acæna pumila*. We spent the forenoon of the 6th of January at Port Famine, and I collected specimens of a number of plants, though, as I have already said, I did not meet with the one of which I was chiefly in search. I found specimens of a bright yellow orchid which I had previously procured at Sandy Point; it is, I have little doubt, your *Asarca* (?) *Kingii. The petals are connivent.* I also got beautiful specimens of the lovely *Codonorchis Lessonii.* We arrived at Sandy Point on the evening of the same day; and we expect to be here until after the 19th, as we are awaiting the arrival of a steamer from Valparaiso, which we hope will bring our mails. I have picked up one or two plants I had not before observed—one the pretty little blue *Gentiana*, and another a low shrubby plant with evergreen leaves and small obscure reddish-purple pentandrous flowers. This last I found in the weeds adjoining the coal-mine some miles above the settlement. I shall enclose a fragment, and shall feel much obliged if you will name it for me. The settlement is extending under the vigorous management of the Governor. It appears to be well adapted to the growth of potatoes and other green crops which do not require much heat; and the harder kinds of grain, such as, for example, rye, might, I think, have a good chance of ripening; and there is also good pasturage for cattle. One of the great difficulties that the colony will have to contend with, as it appears to me, is the absence of exports, without which it is difficult to see how it can be self-supporting. However, gold has been recently found in some quantity in the alluvial soil of the banks of a small river which runs through the settlement; and should a gold-field be established, this would put the place on a firmer footing. From the time we entered the channels till we arrived at this place we had more or less rain every day, and I suppose we shall experience a similar fate when we return to the westward in a fortnight's time. Our present expectation is to be occupied in the Channels till the beginning of May, and then to move northward by stages to winter at Valparaiso and Coquimbo before coming down for a final season. I fear I am not likely to accomplish much more in the specimen line, as I have already observed that the plants and animals of these regions extend over very wide areas—but, of course, will sedulously explore every place we are at. I earnestly hope that we shall be at home in the course of the next eighteen months.

With kindest regards, in which Captain Mayne joins me,

Believe me, my dear Sir,

Ever yours most truly,

ROBERT O. CUNNINGHAM.

A Monograph of the British Roses.

By J. G. Baker, F.L.S. &c.

[Read March 18, 1869.]

For a considerable time I have made the British Roses a subject of special attention. Till lately I lived in a country district exceedingly rich in forms, and gathered and distributed during each of several consecutive years many hundreds of specimens. In 1864 I contributed to a journal, circulating principally amongst the working naturalists of the north of England, a review, more particularly, of the North-of-England forms, and issued a set of specimens in illustration of the written notes. This paper Mr. Boswell Syme did me the honour of adopting as the basis of his account of the genus in the third edition of 'English Botany.' At the time, and since, I have been repeatedly urged by correspondents at home and abroad to undertake a more complete and systematic monograph of the British species, embracing a full enumeration and description of the forms which we possess, and a recapitulation of their synonymy in continental books, and their distribution beyond the limits of our own island. This it is my purpose now to attempt, and to lay the result before the Linnean Society, in whose Transactions, now more than half a century ago, was published the Monograph by Woods, which has ever since been the standard of reference on the subject.

I have had the opportunity of examining all the principal public collections in this country, including those of Linnæus, Smith, and Woods at the Linnean Society, of Buddle, Plukenet, and the general collection at the British Museum, of Turner, Hooker, Borrer, and a set from Lindley and Besser at Kew, and of Winch and Robertson at the Newcastle Museum—and, of private collections, have been entrusted for leisurely examination with those of Mr. Watson, Professor Babington, Dr. Moore, Mr. Boswell Syme, and Professor Oliver. For a liberal supply of specimens from the districts where they live I am indebted to Mr. T. R. A. Briggs, of Plymouth, Rev. A. Bloxam, of Twycross, Dr. St. Brody, of Gloucester, Mr. Webb, of Liverpool, Mr. Bromwich, of Myton, in Warwickshire, and Mr. Jas. Ward, of Richmond, in Yorkshire. With the three botanists upon the Continent who of late years have particularly devoted themselves to the genus, M. Alfred Déséglise in France, Dr. Rapin in Switzerland and Professor Crepin in Belgium, I have had the honour of a correspondence of many years' duration, and, especially from the first of the three, whose enthusiasm in the cause of *Rosa* has been attested by an elaborate monograph of the French species, illustrated by a published fasciculus of specimens beautifully selected and preserved, I have received a liberal supply of authenticated Roses and a free communication of the notes suggested to them by the study of the British forms which I have sent them.

In quoting continental synonyms, over and above the original authority for a name, I have restricted myself almost entirely to the most recent works in which the Roses of the adjacent countries of the Continent are described, of which the following are the principal.

Déséglise, 'Essai monographique sur cent cinq espèces de Rosiers appartenant à la Flore de la France.' Angers: 1861. 'Revision de la Section *Tomentosa* du genre *Rosa*.' Angers: 1866.

Reuter, 'Catalogue des Plantes vasculaires qui croissent naturellement aux environs de Genève.' 2nd edit. Geneva: 1861.

Grenier, 'Flore de la Chaîne Jurassique,' part 1. Paris and Besançon: 1865.

Dumortier, 'Monographie des Roses de la Flore Belge.' Gand: 1867.

I have also quoted regularly the set of specimens, 135 in number, deposited by Woods at the Linnean Society in authentication of his paper, the published fasciculi of Déséglise, the Herbarium Normale of Fries, and my own.

As this paper may reach collectors isolated in the country, I will venture to add a counsel upon the character of specimens taken for drying. To illustrate a Rose so that a definite opinion can be formed upon it, it is necessary, in addition to a flowering branch, such as no one omits to gather, to have well-developed fruit; so much the better if taken both at the stage when it is fully grown but still green, and also after it has partially ripened, and to have also a portion of woody stem that will show clearly the well-developed prickles; and it is also better to take, in the same way as in *Rubus*, a portion of a shoot bearing leaves only, because it is only upon these barren branches that the leaves reach their full development.

In the diagnoses it will be seen that I have laid great stress upon the character of the prickles. Here, as in *Rubus*, I believe that we get some of our best contrasts of character by separating the forms in which the prickles are scattered and uniform (as in *canina*, *arvensis*, and *villosa*) from those in which the prickles are more abundantly developed and run down into aciculi by gradual stages of transition (as in *Sabini*, *rubiginosa*, and *spinosissima*). In the well-developed prickle in *Rosa* we may trace three types of form:—the comparatively slender and nearly straight type, as in *mollissima* and *spinosissima*; the falcate type, which, besides being decidedly hooked, is much more robust downwards than in the last, and breaks off from the branch with a differently shaped scar, as in *canina* and *micrantha*; and, thirdly, the parrot's-beak type, which is deltoid, with a short slightly hooked point, as in *stylosa* and *arvensis*.

The nature of the fruit furnishes characters which are very useful for diagnostic purposes, only unfortunately they are to a large extent lost in dried specimens. In the common Dog Rose the sepals remain reflexed after the petals fall, and become disarticulated at the base before the hip becomes at all scarlet (this is what is meant by *deciduous* sepals); in *tomentosa, rubiginosa*, and *hibernica* the sepals ascend after the petals fall, and remain erect upon the top of the hip till it changes colour, but become disarticulated before it fully ripens (this is what is meant by *subpersistent* sepals); whilst in *mollissima, involuta*, and *spinosissima* the sepals ascend in the same way and remain till the fruit is fully ripe (this is what is meant by *persistent* sepals). And between the character of the sepals and the extent to which the disk which closes in the top of the fruit is developed, and hairiness and cohesion of the styles, there is a close correlation. The forms that have persistent sepals have the fruit-disk hardly at all, or not at all, developed, and the styles very hairy and not at all agglutinated. The forms with subpersistent sepals, on the contrary, have the disk always prominently developed, and the styles are consequently crowded closer together and are much less hairy; and the development of the disk culminates in *stylosa* and *arvensis*, in which, in combination with deciduous sepals, we have the styles quite glabrous and united together in a prominent column.

*Clavis specierum**.

Styles free, scarcely, if at all protruded beyond the top of the calyx-tube.

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* Rare aberrant forms both here and in the diagnosis sometimes not taken into account.

Group 1. SPINOSISSIMÆ. Low erect compact bushes, with crowded and very unequal prickles, the large ones slender and nearly or quite straight. Leaves naked or hairy, never more than slightly glandular beneath. Sepals persistent or subpersistent.

Fruit dark purple. Flowers always solitary. 1. *spinosissima.*
Fruit bright red. Flowers not essentially solitary.
  Sepals truly persistent, always simple, thinly glandular on the back. Leaves quite naked, with simple teeth. 2. *rubella**.
  Sepals truly persistent, more or less compound, densely glandular on the back. Leaves more or less, often very hairy, the teeth generally compound.............. 3. *involuta.*
  Sepals compound, naked on the back, not fully persistent. Leaves naked or thinly pubescent beneath, simply toothed. 4. *hibernica.*

Group 2. VILLOSÆ. Larger bushes, erect or lengthened out and arching. Prickles uniform, scattered, slender, scarcely at all hooked. Sepals persistent or subpersistent, always densely glandular on the back. Leaves generally very hairy and inconspicuously or not at all glandular beneath.

Sepals truly persistent. Fruit ripening early, with no disk.
  Bush arching; sepals copiously compound 5. *pomifera.*
  Bush erect; sepals sparingly compound ... 6. *mollissima.*
Sepals not truly persistent; fruit later in ripening, with a distinct disk like that of *canina* .... 7. *tomentosa.*

Group 3. RUBIGINOSÆ. Smaller bushes than in the last and next group, erect or arching; the prickles scattered, stouter downwards, and decidedly hooked, sometimes with a few aciculi mixed amongst them. Leaves thinly hairy or not at all hairy, but always densely glandular over the under surface. Sepals subpersistent.

Very odorous; bush erect and compact ...... 8. *rubiginosa.*
Arching bushes without decided Sweet-briar fragrance.
  Prickles uniform; flowers and leaves small; styles naked; peduncle generally aciculate .... 9. *micrantha.*

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* This and *pomifera,* though introduced in the Clavis, have, as will be seen, no fair claim to be regarded as British plants.

Prickles often with a few aciculi intermixed; flowers and leaves larger; styles hairy; peduncle rarely aciculate.
10. *pulverulenta.*

Group 4. CANINÆ. Larger bushes, always lengthened out and arching. Prickles uniform, scattered, decidedly hooked, and thickened downwards. Sepals deciduous or subpersistent, usually naked on the back. Peduncle generally naked, and leaves naked, or but thinly hairy, and not at all glandular over the surface.

The only species .... 11. *canina.*

SYSTYLÆ. Styles united into a slender column which is protruded beyond the disk. Arching or trailing bushes. Prickles uniform, stout, hooked. Sepals deciduous. Fruit late in ripening.

A high arching bush like *canina*, with copiously compound sepals; the style-column shorter than the stamens.
12. *stylosa.*

A low trailing bush with short slightly compound sepals and a style-column equalling the stamens ...... 13. *arvensis.*

Group 1. SPINOSISSIMÆ.

1. **R. SPINOSISSIMA**, *Linn.* **Frutex erectus, ramis brevibus compactis, aculeis confertis subulatis subrectis ad aciculos copiosos sensim transeuntibus, foliolis parvis obtusis firmis simpliciter serratis utrinque omnino glabris, floribus semper solitariis, sepalis ascendentibus dorso nudis simplicibus persistentibus, fructibus erectis atro-purpureis nudis depresso-globosis, disco nullo.**

R. SPINOSISSIMA, *Linn. Sp. Plant.* p. 705; *Woods, Linn. Trans.* xii. p. 178, *Herb.* 7–15; *Déséglise, Mon.* p. 46, *Exsic.* 6; *Gren. Fl. Jur.* p. 226, *non Reich. Fl. Excurs.* ii. p. 612.

R. PIMPINELLIFOLIA, *Linn. Sp. Plant.* p. 703 *and Herb.*!; *Reich. Fl. Excurs.* ii. p. 612; *Reut. Cat.* p. 63; *Fries, Herb. Norm.* x. no. 52; *Dumort.* α, β, γ, p. 41.

Stems usually quite erect, 1 to 3 feet high, with short, stiff, compact branches; the prickles very dense, with every stage of transition between minute aciculi and the largest, the latter 3 to 4 or even 5 lines long, with a long needle-like point, and the lower part but little thickened, spreading horizontally or slightly deflexed; the scars 3 lines deep. Branches often bright reddish brown. Stipules quite naked on the back, faintly gland-ciliated. Full-grown leaves 1½ to 2 inches long, with 7 to 9 oblong leaflets, the terminal one 6 to 8 lines long by three-quarters as broad, blunt, the base generally rounded; the serratures quite simple, moderately sharp and open; texture firm, with transparent venation; both sides quite glabrous and glandless. Petioles without hairs, but often with a few glands. Peduncles invariably solitary and bractless, generally 6 to 9 lines long, naked, more or less densely beset with setæ and aciculi. Calyx-tube globose, naked, or very rarely slightly aciculate. Sepals invariably quite simple, $\frac{3}{8}$ to $\frac{1}{2}$ inch long, naked on the back; the point slightly leafy and gland-ciliated. Corolla 12 to 18 lines across when expanded, white, with a yellow throat, rarely variegated with red. Styles densely villose. Disk none. Fruit depresso-globose, dark purple, with a dark purple juice; 5 to 6 lines broad, quite naked, crowned with the erect persistent sepals; changing colour in September in the low country in England.

In Britain, extending from the south of England to Caithness, ascending in the north of England to 500 yards above the sea-level, and in the Scotch Highlands to nearly 600 yards, and in Ireland also reaching from the north to the south, with a preference for the sands of the seashore, and, inland, for limestone. Though it is the only Rose known in Iceland, yet in Scandinavia it is much less boreal in its range than *mollissima* or *canina*, being restricted, like *tomentosa*, to the south-west. It is universally distributed through Central and Southern Europe, reaching the Barbary States, Cashmere, and, through Siberia, to the north of China (Prof. Bunge!). Though it varies much according to its place of growth in luxuriance and the density of its prickles, we do not appear to have in Britain any striking variety. With us the form with a naked peduncle is much the most common, that with an aciculate peduncle quite rare. Lindley's var. *platycarpa* (Monog. p. 51) is a small Irish form with an aciculate peduncle, his var. *turbinata* (*loc. cit.*) another small form with turbinate fruit, and his var. *reversa* (*R. reversa*, Lindl. Bot. Reg. t. 431, non Waldst. et Kit.) another small form with slender deflexed prickles and ovate fruit. The form with the flowers variegated with red, *R. Ciphiana*, Sibbald, Scot. ii. p. 46, t. 2, is the parent of many of the garden Scotch Roses. A plant with red fruit was gathered by Mr. Borrer in Sussex, and another with ovate-urceolate fruit by Mr. Jackson in Scotland and Mr. Robertson in Durham. Var. *pilosa*, Lindl., evidently does not belong here, but to *R. involuta*. *R. sanguisorbifolia*, Donn, Hort. Cant. edit. 8, p. 169, is a mere form of this, with 9 to 11 leaflets. The principal European varieties are:—*R. Ripartii,* Déség. Mon. p. 47, Exsic. 7, Billot, Exsic. 3378 (*R. spinosissima,* Reich. Fl. Excurs. ii. p. 612), with doubly-toothed leaves, more decidedly glandular petioles and stipules, and peduncles usually but not always aciculate; *R. consimilis,* Déség. Mon. p. 50, Exsic. 9, with glabrous styles, unarmed and glandular petioles, and simply toothed leaflets slightly hairy on the midrib beneath; *R. spreta,* Déségl. Mon. p. 50, Exsic. 8, with less numerous prickles, thinly hairy styles, and unarmed petioles; and *R. myriacantha,* DC. Fl. Fr. iv. p. 439, Lindl. Mon. p. 55, t. 10, a stunted, compact, erect plant with very long and very dense prickles, doubly toothed leaflets densely glandular all over beneath, deep-red flowers, peduncle and usually the calyx-tube densely aciculate and setose, and simple sepals densely glandular on the back. Other varieties are the Siberian *R. altaica,* Willd. Hort. Ber. p. 543 (*R. grandiflora,* Lindl. Mon. p. 53), and the Himalayan *R. unguicularis,* Bert. Misc. No. 22, tab. 3, p. 15.

2. R. RUBELLA, *Smith.* Frutex erectus, ramis brevibus compactis, aculeis confertis subulatis gracilibus ad aciculos copiosos sensim transeuntibus, foliolis parvis obtusis firmis simpliciter vel paullulum duplicato-serratis utrinque omnino glabris, floribus plerisque solitariis, sepalis dorso tenuiter glandulosis simplicibus persistentibus, fructibus rubris ovato-rotundatis vel ovato-urceolatis subnudis plerisque cernuis, disco nullo.

R. RUBELLA, *Smith, Eng. Bot.* t. 2521, *Eng. Flora,* ii. p. 374; *Woods, Linn. Trans.* xii. p. 177, *Herb.* 2–4; *Godet, Flore du Jura,* p. 205; *Grenier, Fl. Jura,* p. 227.

R. GENTILIS, *Stern. Bot. Zeit.* 1826, *Beibl.* 79; *Koch, Syn.* 2nd edit. p. 247.

R. PIMPINELLIFOLIO-ALPINA, *Rapin, Reut. Cat. Gen.* p. 64.

A bush with just the general habit of *spinosissima,* but the prickles more slender and fewer in proportion to the small setaceous aciculi, the branches sometimes denuded. Stipules rather broader, with lanceolate gland-ciliated auricles. Full-grown leaves 1½ to 2 inches long, with 7–9 leaflets, which are just like those of *spinosissima* in texture, but more oblong and more sharply toothed; the terminal leaflets 8–9 lines long by three-quarters as broad; the serrations simple or slightly compound; both sides quite free from pubescence, but the petiole glanduloso-setose, and the glands extending more or less to the midrib beneath. Flowers usually solitary, but occasionally in twos; the peduncle 6–12 lines long, always glanduloso-setose and aciculate; the calyx-tube ovato-urceolate, naked or slightly glanduloso-setose; the sepals quite simple, 5–8 lines long, slightly leafy at the point, thinly glandular on the back. Corolla cream-coloured, or often variegated with red, 12–18 lines across when expanded; the styles densely villose. Fruit bright red, changing colour in England early in September, usually but not invariably drooping, roundish or short ovato-urceolate, 6–8 lines long; the sepals fully persistent. Disk none.

This is a plant well-known in botanic gardens, and evidently the same as the Jurassic plant which I have from Dr. Rapin, and as the Istrian plant with which Koch identified it. It is very like *spinosissima* in habit and prickles; but the fruit is different, the peduncles are always aciculate, the sepals are glandular on the back, and the flowers not always solitary. *R. stricta* of Muhlenberg (Lindl. Mon. p. 42, t. 9—a plant attributed to Pennsylvania, no doubt in error, as it has never been gathered in recent times), and *R. Candolleana*, Thory, in Ros. Red. 4to, vol. i. t. 32, do not appear to differ from it by any tangible characters; and the Himalayan *R. Webbiana*, Wall. Royle's Illust. i. p. 42, is very nearly, if not absolutely, identical with it. There are specimens in several herbaria labelled as having been collected by Winch on the sands of the seashore south of Shields Law on the Durham side of the Tyne; but Winch certainly did not know it clearly, for a plant collected by Mr. Hogg near Hartlepool, which he called *rubella*, is only ordinary *spinosissima*, and it is probable that some confusion has arisen. I have not seen specimens complete enough to be able to form a clear opinion as to what are the relations to this of *R. reversa*, Waldst. and Kit. Pl. Rar. Hung. p. 264; but the difference, if any, must be very slight. Dr. Thomson's extensive suite of specimens from the Himalayas appear to run this by gradual stages into *spinosissima*. My specimens from the Alps are too few to show fairly what may be the case there; and, on the other hand, as will be seen, it comes exceedingly near to some of the varieties of the next.

3. R. INVOLUTA, *Smith*. Frutex erectus ramis plerisque brevibus, aculeis subulatis subrectis ad aciculos copiosos sensim transeuntibus, foliolis mediocribus plerisque duplicato-serratis plus minus pubescentibus infra sæpe leviter glandulosis, floribus 1 vel paucis, pedunculis dense aciculatis et glanduloso-setosis, sepalis ascendentibus persistentibus dorso dense glandulosis, majoribus pinnatis vel raro subsimplicibus, fructibus serotinis erectis subrotundatis, disco nullo.

Though *involuta* is the name which has the right of priority, yet the variety afterwards called *Sabini* is much the most common, and I therefore take it first.

Var. SABINI (*Woods*).

R. SABINI, *Woods, Linn. Trans.* xii. p. 188 (1816), ***Herb.*** **22–24**; ***Smith, Eng. Flora,*** ii. p. 380; *Borrer, E. B. S.* t. 2594; ***Baker, Review,*** p. 5, *Exsic.* 1, 2; *Dumort. Belg.* p. 42.

R. NIVALIS, *Donn, Hort. Cant.* edit. 8, p. 170.

R. CORONATA, *Crepin, Notes,* ii. p. 25; *Wirtg. Exsic.* 1858, No. 270, and 1860, no. 270 bis; *Reut. Gen.* p. 67; *Gren. Fl. Jura,* p. 231.

R. SABAUDA β. CORONATA, *Rapin, Vaud Guide,* 2nd edit. p. 192.

In exposed places an erect shrub 2–4 feet high, with short compact branches with dense prickles passing down by gradual stages into aciculi; in shade or hedges sometimes drawn out and arching. Full-grown prickles 3–4 lines long, scarcely at all curved or thickened in the lower part; the scar $\frac{1}{4}$ inch deep. Stipules hairy on the back, and sometimes slightly glandular, densely gland-ciliated. Well-developed leaves of the barren shoots $2\frac{1}{2}$–3 inches long; the terminal leaflet ovate-oblong, 9–12 lines long by three-quarters as broad; the base broadly rounded, or even cordate; the teeth open and copiously compound; the upper surface thinly grey-pubescent, the lower more so, and often slightly glandular. Petioles densely hairy, glanduloso-setose, and aciculate. Flowers 1–3; the peduncle 6–12 lines long, densely aciculate and setose; the calyx-tube subglobose, more or less densely aciculate; the sepals $\frac{5}{8}$–$\frac{3}{4}$ inch long, densely glandular on the back, lengthened out into a decidedly leafy point, and copiously gland-ciliated, the main ones with one or two small narrow pinnæ on each side. Corolla varying from pure white to deep pink, $1\frac{1}{2}$ or even 2 inches across when expanded. Styles densely villose. Sepals ascending after the petals fall, quite persistent upon the erect roundish red fruit, which measures 7–8 lines each way, and changes colour in the north of England late in September or early in October, and is only produced very sparingly. Disk none.

Sparsely distributed through Britain, from the Isle of Wight (*Herb. Watson*!) and Sussex (*Borrer*!) northward to Caithness (*R. Dick*!), ascending to 300 yards in Yorkshire, and probably to a considerable height in Forfarshire, as Don localizes a specimen "on a rock on one of the mountains at the head of Clora, near the limits of perpetual snow" (hence his name *nivalis*). According to a note by Turner in the Kew herbarium, Dr. Walker's Hebridean plant called *involuta* is this variety. It appears to reach its maximum of frequency in the north of England. Several stations are known in the north of Ireland. *R. gracilis*, Woods, Linn. Trans. xii. p. 186, Herb. 21, Smith, Engl. Fl. ii. p. 379, is not more than a robust condition of this variety with the prickles, like the rest of the plant, abnormally stout and a little curved. *R. villosa*, Engl. Bot. t. 583, is drawn from this, with the exception of the fruit, which is that of *R. pomifera*; and it is the latter that Smith had in view in his observations.

Var. DONIANA (*Woods*).

R. DONIANA, *Woods, Linn. Trans.* xii. p. 185, *Herb.* 18–20; *Smith, Engl. Flora,* ii. p. 378; *Borrer, E. B. S.* t. 2601.

R. SABINI β. DONIANA, *Lindl. Mon.* p. 59; *Borrer, Brit. Fl.* edit. 3, p. 232.

A form of dry exposed situations with leaflets more densely hairy than in the last and consequently greyer green and softer; the calyx-tube and fruit densely prickly; the flowers solitary and sepals hardly, if at all, pinnate.

Var. GRACILESCENS, *Baker*.

A robust Irish form, gathered in co. Antrim by Dr. Moore, with leaves 3–3½ inches long, ovate leaflets, thinly hairy on both sides, not at all glandular beneath, with copiously compound toothing, the terminal one 15–16 lines long by nearly an inch broad; petioles with few or no aciculi and glandular setæ; flowers 3–6 in a cluster, aciculate peduncles, and naked elliptical calyx-tube.

Var. ROBERTSONI, *Baker, Review*, p. 8, *Exsic.* 3.

R. INVOLUTA, *Winch, Geog. Distrib.* p. 41, *non Smith.*

R. SABINI β, *Smith, Eng. Flora,* ii. p. 380.

Intermediate between *Sabini* and the original *involuta*. Leaflets with the teeth sharper and less compound than in *Sabini*, glabrous (when mature) on the upper surface, hairy principally on the ribs and inconspicuously glandular beneath; calyx-tube sometimes, but not always, naked; sepals as compound as in *Sabini*.

I have gathered this lately in the original station near Newcastle and also in North Yorkshire, and received it from Derry from Dr. Moore.

Var. SMITHII, *Baker*.

R. INVOLUTA, *Smith, Engl. Bot.* t. 2068 (1809), and fruit, t. 2601; *Engl. Flora*, ii. p. 377; *Woods, Linn. Trans.* xii. p. 183, *Herb.* 17; *Lindl. Mon.* p. 56; *Borrer, Brit. Flora*, p. 232.

R. SABAUDA, *Rapin, Bull. Soc. Hall.* p. 175; *Vaud Guide*, edit. 2. p. 191; *Reut. Cat.* p. 64; *Gren. Fl. Jura*, p. 229.

A stunted erect bush, with leaflets naked when mature on the upper surface, hairy principally on the midrib beneath, and scarcely at all glandular, the serrations closer and sharper than in all the preceding forms and but slightly compound; the flowers solitary, the peduncle and calyx-tube densely aciculate, the sepals simple.

The only British specimens I have seen well representing this variety were gathered in Arran by George Don and by Mr. James Ward near Richmond in Yorkshire.

Var. LÆVIGATA, *Baker*.

Peduncle and calyx-tube quite naked, the latter depresso-globose; the leaves like those of *Sabini* in clothing and toothing, the petioles villose and glanduloso-setose, but scarcely at all aciculate; the sepals all quite simple and not glandular on the back.

Gathered by the late Mr. Hailstone near Broughton Spa, West Yorkshire, and a similar plant by Dr. Moore in Antrim and Derry.

Var. MOOREI, *Baker*.

Prickles stouter than in any of the other forms, the largest 5–6 lines long, slightly curved; the scar $\frac{3}{8}$ inch deep. Leaflets nearly naked above, thinly hairy and densely glandular beneath, the serration like that of var. *Smithii*; the petiole scarcely at all hairy, but densely glanduloso-setose, and furnished with numerous unequal aciculi, the larger ones decidedly falcate. Flowers one or more; both peduncle and tube densely aciculate and glanduloso-setose. Largest sepals 8–9 lines long, slightly pinnate.

Near the sea, Tamlaghbard, Derry, *Dr. Moore*! Recedes from the type (by its prickles and leaves glandular beneath) towards some of the *Rubiginosæ*, but yet evidently belongs here.

Var. OCCIDENTALIS, *Baker*.

R. SPINOSISSIMA, var. PILOSA, *Lindl. Mon.* p. 51; *Borrer, Brit. Flora*, p. 229.

Very near *Wilsoni*, but the leaves smaller, slightly hairy beneath, and the petiole glanduloso-setose and aciculate, the serration nearly, but not quite, simple; the peduncle densely aciculate and glanduloso-setose; the calyx-tube globose, naked, the main sepals not more than half an inch long, with one or two setaceous pinnæ on each side.

Described by Lindley from an Irish specimen still in the Hookerian herbarium, the exact station not known.

Var. WILSONI (*Borrer*).

R. WILSONI, *Borrer, Brit. Flora,* edit. 3, p. 231; *E. B. S.* 2723.

An erect bush 2 or 3 feet high, with deep vinous purple branches and leaves, and stipules often suffused with the same colour. Prickles as in *Sabini*. Leaflets often cordate, the terminal ones 12–15 lines long by 8–12 lines broad, naked (when mature) above, thinly hairy on the ribs below, but scarcely at all glandulose; the serrations moderately open, quite simple; the aciculi of the petiole few and slender. Flowers 1–3, full pink; the peduncles moderately aciculate and setose; the tube naked, or very nearly so; the sepals either all simple, or the largest with one or two minute setaceous pinnæ; the fruit with more of a tendency than in *Sabini* to an ovato-urceolate shape, when well developed 8–9 lines long by half an inch broad.

Banks of the Menai, near Bangor (*Wilson*!, *Webb*!, *Bloxam*!), and just the same plant gathered by Dr. Moore at Umbra rocks, co. Derry.

It will be seen by the descriptions that the extreme forms placed here run into one another by very gradual stages. *Doniana* is like reduced *mollissima*, with crowded unequal prickles, whilst *Wilsoni* touches close upon *rubella*, and *Moorei* approaches some of the *Rubiginosæ*. It is noteworthy that a plant so widely spread in Britain, and with so many varieties, should be so rare upon the Continent. It is known only in two widely separated tracts—the provinces of Namur and Luxemburg, in Belgium, and upon Mount Saleve, near Geneva. There is a variety in Belgium (var. *subnuda*, Crepin, Notes, ii. p. 25; Dumort. Ros. p. 42) not yet found in Britain, with smooth peduncles and calyx-tube, copiously compound serratures, leaves naked on the upper surface, densely glandular beneath, but only a little hairy on the veins. The Sicilian *R. Heckeliana*, Tratt. Mem. ii. p. 85, Guss. Syn. i. p. 562, is an almost precise counterpart of *Doniana* in general habit; but the prickles are uniform and curved, and the major sepals copiously compound.

4. **R. HIBERNICA**, *Smith*. Frutex erectus, ramis plerisque brevibus, aculeis modice robustis leviter falcatis ad aciculos subulatos sensim transeuntibus, foliolis mediocribus simpliciter serratis supra nudis infra nudis vel leviter pubescentibus, omnino eglandulosis, floribus 1 vel paucis, pedunculis plerisque nudis, sepalis ascendentibus subpersistentibus dorso nudis majoribus plene pinnatis, fructibus serotinis erectis rotundatis nudis, discis mediocribus instructis.

R. HIBERNICA, *Smith, Eng. Bot.* t. 2196, *Eng. Flora,* iii. p. 393; *Woods, Linn. Trans.* xii. p. 222, *Herb.* 107; *Lindl. Mon.* p. 82; *Baker, Review,* p. 9.

In exposed places an erect shrub 3 or 4 feet high, but in hedges drawn out and slightly arching. Prickles less crowded than in *involuta,* but running gradually down into setaceous aciculi in the same way. Main prickles stouter than in the last, decidedly curved, the scar 5–6 lines deep. Leaves of the barren shoot 3–4 inches long, the terminal leaflet broad-oblong or ovate-oblong, 9–12 lines long by three-fourths as broad, the upper surface a slightly glaucous green, naked or inconspicuously hairy on the midrib, the lower surface thinly hairy on the veins, not at all glandular; the serration moderately sharp and open, the teeth simple or casually gashed, the petiole pubescent, with three or four slender hooked aciculi and an occasional gland. Stipules scarcely at all hairy on the back, with deltoid gland-ciliated auricles. Flowers generally 1 to 3, but sometimes up to a dozen, the peduncle 4–6 lines long, quite naked, the globose or broad-ovate calyx-tube the same, the segments 8–9 lines long, quite naked on the back, the main ones copiously leaf-pointed and pinnate. Corolla pale-pink, 15–18 lines across when expanded. Styles densely hairy. Sepals ascending after the petals fall, but not fully persistent. Fruit roundish, about half an inch long and thick, crowned with a decided disk, not ripening till October. The form with hairy leaves occurs in Derry and Down (*Templeton*!, *Dickie*!, *Moore*!, &c.), and in England, in Cumberland (*Borrer*!) and Cheshire (*Webb*!). A form (var. *glabra*, *Baker*, *Review*, p. 11, *Exsic.* p. 4) with sharper teeth and leaves quite naked has been gathered in Sutherlandshire (Healam Ferry, near Loch Eriboll) and in Durham (near Witton-le-Wear) by Prof. Oliver, in Cumberland by Mr. Borrer, in North Yorkshire by Mr. Mudd and myself, in Cheshire by Mr. Webb and others, and in Surrey by Mr. R. Castle; and Dr. Moore has found another glabrous form with larger nearly round leaves and blunter teeth than in the type on rocks at 1000 feet above the sea-level on Ben Evanagh, co. Derry.

Var. CORDIFOLIA, *Baker, Review,* p. 20.

Prickles more slender and denser than in the type, the large ones scarcely curved. Terminal leaflet 15–18 lines long by 1 inch broad, the base cordate. Leaves nearly naked below, the teeth more open and blunter than in the type, the peduncle aciculate and glanduloso-setose up to the base of the calyx-tube.

Northumberland; in Coquetdale, between Flotterton and Rothbury, *Prof. Oliver*!

No one who has once seen this growing is likely to confound it with any other species. The fruit is different from that of *involuta*; but to all the other distinguishing characters taken singly, some of the forms furnish an exception.

In general habit, when in flower, the ordinary glabrous English form has just the same sort of resemblance to typical *canina* that *Doniana* has to *mollissima.* Though so widely distributed in Britain, *hibernica* is quite unknown upon the Continent. The nearest plant to it is *R. Schultzii,* Ripart in Schultz's Archives, p. 254; Déség. Mon. p. 65; but this has less crowded and less unequal prickles, and ripens its fruit very early.

Group 2. VILLOSÆ.

5. **R. POMIFERA,** *Herm.* **Frutex maximus, ramis arcuatis, aculeis sparsis æqualibus rectis gracilibus, foliolis copiose duplicato-serratis subduplo longioribus quam latis utrinque tenuiter griseo-pubescentibus, infra inconspicue grandulosis, floribus 1 vel paucis, pedunculis brevibus dense aciculatis, sepalis ascendentibus dorso dense glandulosis plene persistentibus majoribus copiose pinnatis, fructibus rotundatis præcocibus, disco nullo.**

R. POMIFERA, *Herm. Diss.* p. 17; *Koch, Syn.* edit, 2, p. 253; *Reut. Cat.* p. 67; *Dumort. Ros.* p. 48; *Déségl. Mon.* p. 129, *Toment.* p. 44; *Fries, Herb. Norm.* ix. no. 47.

R. VILLOSA, *Linn. Sp. Plant.* p. 704 (ex majore parte); *Smith, Eng. Fl.* ii. p. 538; *Woods, Herb.* 37; *Lindl. Mon.* p. 74 (excl. syn. *R. gracilis*).

R. VILLOSA *a, Huds. Fl. Angl.* edit. 2, p. 219; *Seringe in DC. Prodr.* ii. p. 618.

R. SYLVESTRIS POMIFERA MAJOR NOSTRAS, *Ray,* edit. 1, p. 221; *Buddle, Herb.*!

R. CILIATO-PETALA, *Besser, Volh.* p. 66; *Reich. Fl. Excurs.* ii. p. 616, *Exsic.* 2567 ! non *Koch.*

R. RESINOSA, *Sternb. in Reich. Fl. Excurs.* ii. p. 616, *Exsic.* 1271 !, non *Déséglise.*

A robust arching bush 4 to 6 feet high, with a trunk sometimes as thick as a man's arm, with dull purplish glaucous branches and scattered, uniform, slender prickles 4 to 6 lines long. Well-developed leaves 5 to 7 inches long, the terminal leaflet oblong or with a slight ovate tendency, 1½–2½ inches long, generally only about half as broad, grey-green, but not softly pubescent on both sides as in *mollissima*, the underside often slightly glandular, the teeth open and copiously compound. Flowers 1 to 3, the peduncle generally not more than ½ an inch long, densely aciculate and setose, the calyx-tube round, glaucous, usually densely prickly, the sepals converging, fully persistent, densely glandular on the back, 9–12 lines long, the main ones copiously pinnate, the fruit ripe in August, bright red, globose or broadly turbinate, often, but not always, pendent, densely covered with strong prickles.

A stronger-growing plant than *mollissima*, with arching branches, larger and more openly toothed, narrower leaves, not so softly pubescent, and larger flowers and fruit, and copiously compound sepals. It is an old favourite in gardens, but seems to possess no fair claim to be considered British. Ray clearly had this in view when he wrote "Fructus Pyri parvi forma et magnitudine spinulis obsiti;" and he localizes it "in montosis septentrionalibus Eboracensis et Westmorlandici agri copiose;" but no doubt he did not recognize *mollissima* and *tomentosa* as distinct from it. The English specimens gathered of late years, which we have seen, are from Staffordshire, Cotes Heath, *Rev. R. C. Douglas*; and Gloucestershire, Coppice-wood, near Painswick, *Dr. S. Brody*! It is a native of Scandinavia ("vere alpina"), Belgium, North Germany, the Alps, and Jura, reaching the Pyrenees, Apennines, and Tyrol, and, according to Nyman, Castille, Tauria, and Mount Athos. The corolla is often beautifully gland-ciliated, and in cultivated specimens we have seen it 3 in. across.

6. R. MOLLISSIMA, *Willd.* **Frutex erectus, ramis brevibus erecto-patentibus, aculeis sparsis æqualibus rectis gracilibus, foliolis copiose duplicato-serratis, utrinque molliter griseo-pubescentibus, infra interdum inconspicue glandulosis, floribus 1 vel paucis, pedunculis bre-**

vibus dense aciculatis, sepalis ascendentibus dorso dense glandulosis, plene persistentibus, majoribus paullulum pinnatis, fructibus rotundatis præcocibus aciculatis vel nudis, disco nullo.

R. MOLLISSIMA, *Willd. Prodr. Fl. Berol.* no. 1237 (1787); *Gmel. Fl. Bad.* ii. p. 409; *Borckh. Forst.* ii. p. 1314; *Fries, Novit.* ii. p. 151, *Herb. Norm.* vii. 42; *Gren. Jura,* p. 231; *Reuter,* edit. 2, p. 66; *Déség. Mon.* p. 125, *Toment.* p. 36; *Dumort. Mon.* p. 49; *Baker, Review,* p. 11, *Exsic.* 5, 6.

R. VILLOSA, *Linn. Sp. Plant.* p. 704, ex parte, *Fl. Suec.* 1293, *Herb.* ! *Woods, Linn. Trans.* xii. p. 189, *Herb.* 25, 29; *Borrer, Brit. Fl.* 3rd edit. p. 233.

R. MOLLIS, *Smith, Eng. Bot.* t. 2459 (1812), *Eng. Flora,* ii. p. 281.

R. HETEROPHYLLA, *Woods, Linn. Trans.* xii. p. 195, *Herb.* pp. 34, 35.

R. CILIATO-PETALA, *Koch, Syn.* edit. 2, p. 253, non *Besser.*

R. GRENIERII, *Déség. Mon.* p. 128, *Toment.* p. 43, *Exsic.* 38 et bis; *Billot, Exsic.* 3602 et bis.

R. RECONDITA, *Puget, Déség. Toment.* p. 46.

Bush erect, 3 or 4 feet high, never arching, with short ascending branches, bright reddish purple with a glaucous tinge in exposure. Prickles scattered, uniform, those of the main stems 3–5 lines long, scarcely at all curved, very little thickened downwards, the scar of the largest not more than $\frac{1}{4}$ inch deep. Fully developed leaves 4–5 inches long, with 7 leaflets, the terminal one ovate-oblong, 15–21 lines long by about three-fourths as broad, the base broadly rounded, or slightly cordate, the serratures open, subdeltoid and copiously compound, the colour generally a paler, greyer green than in any other species, the upper surface always more or less pubescent, the lower more so, and often with a few inconspicuous glands, the petiole densely downy and finely glandular, with a few nearly straight slender aciculi. Stipules copiously gland-ciliated, downy and slightly glandular on both surfaces. Flowers usually 1–3, the peduncles unusually short (3–6 lines), densely aciculated and glanduloso-setose. Calyx-tube round, glaucous, varying from densely aciculate to quite naked. Corolla crimson in bud, deep rose when expanded, rarely white, sometimes gland-ciliated, 15–18 lines across when fully open. Sepals 6–9 lines long, the point leafy, the back densely glandular, only the main ones slightly pinnate, ascending after the petals fall, and quite persistent upon the pulpy globular bright red fruit, which is $\frac{1}{2}$–$\frac{5}{8}$ inch broad and

deep, and ripens before that of any other species, changing colour in the north of England early in August, or even somesometimes late in July, and sometimes, but not always, cernuous. Styles densely villose. Disk none.

From the Humber northward through England and through Scotland this species appears to be universally distributed, coming next in order of frequency to *canina* and *tomentosa*, to which three species at least 90 per cent. of the Roses of the northern half of our island must belong. *Tomentosa* and *mollissima* often resemble one another so closely that it is not safe to pronounce upon ordinary herbarium specimens; but the fruit is very different both in character and time of ripening, and the sepals generally furnish a character, and, when growing, the habit of the bushes is different; and although both have forms with entirely naked peduncles, and often with naked calyx-tubes, this never runs down like the other into forms with stouter curved prickles, or with the leaves nearly or quite naked on the upper surface. Both the British and the Continental distribution of the two appear to be materially different. I have seen this from northward as far as Orkney (*Boswell Syme*!) and Caithness (*Dick*!), but cannot vouch for it from further south than Derbyshire (*Purchas*!), Caernarvon (*Wilson*!, *Bloxam*!), and Merioneth (*Borrer*!, *Lees*!), and now believe that the Isle-of-Wight plant I formerly placed here is *tomentosa*, var. *subglobosa*. In the north of England it ascends to 450 yards above the sea-level. In Ireland I have seen it only from Antrim and Derry; one of Dr. Moore's specimens had a leaf 6½ inches long, with a terminal leaflet 2½ inches long by 2 inches broad. Our plant thoroughly agrees with the Scandinavian one of Fries, which, he says*, is distributed through the length and breadth of Scandinavia, whilst *tomentosa* is restricted to Denmark and Gothland. It is, perhaps, open to doubt whether Willdenow understood the plant clearly; and it certainly has not been individualized definitely by Koch, Reichenbach, or Grenier and Godron; but Roth understood it clearly in

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* "Specierum distributio hujus generis valde insignis et in diversis terris varia: in convallibus alpinis genus centrum suum habet, quamvis sub arcto Lapponiam modo duæ species intrant, *R. cinnamomea* et *mollissima*. Hæc duæ species usque ad Scaniam ubique vulgares, maximam in Scandinavia habent extensionem, quamvis in Germania modo indicentur in convallibus alpinis australibus. E contrario in Scandinavia raræ, in oris occidentalibus potissimum obviam veniunt *R. pimpinellifolia* et *tomentosa*, Sm."—**Fries**, *Summa*, p. 171.

1827, and it is evidently widely diffused through the north of Germany. In the 'Jurassic Flora,' Grenier describes it well, and restricts it to his "région des sapins." I have seen it from numerous places in Savoy, Dauphiné, and Switzerland, but not from any lowland French stations; and it reaches Carinthia and the Tyrol. Our average English form seems to me just Déséglise's *Grenierii*, and his *mollissima* to be a softer, greyer form of our plant, almost destitute of glands. I believe the English plant (gathered by Hailstone in Clydesdale) which he calls *recondita* is only, like the *heterophylla* of Woods, a luxuriant condition of the species. The following are the most striking English varieties :—

Var. CÆRULEA, *Woods.*

R. VILLOSA, var. CÆRULEA, *Woods, Linn. Trans.* xii. p. 189, *Herb.* 26–28.

R. MOLLISSIMA, var. CÆRULEA, *Baker, Exsic.* 7; *Déség. Toment.* p. 38.

Leaves softer and greyer than usual, with very few glands or aciculi on the petiole; the points of the sepals often very leafy; the calyx-tube and fruit broader than deep and perfectly smooth, the fruit pendent; the peduncle with fewer and weaker glandular setæ and aciculi than usual, and in extreme cases quite naked.

A common Northumbrian form, and I have seen it also from Argyleshire (*Hailstone*), Durham (*Robertson*), Cumberland (*Borrer*), and West Yorkshire (*Woods*).

Var. PSEUDO-RUBIGINOSA (*Lejeune*).

R. PSEUDO-RUBIGINOSA, *Lejeune, Fl. Spa*, i. p. 229.

R. SPINULIFOLIA, var. FOXIANA, *Thory, Ros. Redout.* p. 5.

R. VILLOSA, var. SUBERECTA, *Woods, Linn. Trans. loc. cit., Herb.* 30.

R. ARDUENNENSIS, *Crepin, Notes*, ii. p. 30; *Déség. Toment.* p. 7.

R. MOLLISSIMA, var. ARDUENNENSIS, *Dumort. Ros. Belg.* p. 49.

Bracts and veins deep red; upper surface of the leaves nearly naked, and the lower only thinly hairy, but conspicuously glandular; the petiole densely glanduloso-setose, and furnished with numerous unequal aciculi; the stipules densely glandular on the back; the calyx-tube densely aciculate.

West Yorkshire, Settle (*Woods*!). The Thirsk plant referred here by Déséglise is more pubescent and less conspicuously glandular, but the corolla is beautifully gland-ciliated.

7. R. TOMENTOSA, *Smith.* Frutex altus, ramis elongatis arcuatis, aculeis sparsis æqualibus rectis vel subrectis gracilibus, foliolis copiose duplicato-serratis, plerisque utrinque plus minus griseo-pubescentibus, infra interdum inconspicue glandulosis, floribus 1 vel paucis, pedunculis mediocribus dense aciculatis, sepalis ascendentibus dorso dense glandulosis subpersistentibus majoribus copiose pinnatis; fructibus ovato-urceolatis vel rotundatis, aciculatis vel nudis, neque præcocibus nec serotinis, discis mediocribus instructis.

R. TOMENTOSA, *Smith, Fl. Brit.* ii. p. 539 (1800); *Woods, Linn. Trans.* xii. p. 197 (excl. var. *paucis*), *Herb.* 31–33, 38, 39, 44–48, 51–58; *Fries, Herb. Norm.* ix. 46; *Déség. Mon.* p. 98, *Toment.* p. 28; *Reut. Cat.* edit. 2, p. 68; *Gren. Jura*, p. 234; *Dumort. Belg.* p. 50; *Baker, Review*, p. 14, *Exsic.* 8, 9, 10.

R. SYLVESTRIS FRUCTU MAJORE HISPIDO, *Ray*, edit. 2, p. 296 (1696), *teste Buddle, Herb.*!

R. VILLOSA β, *Huds. Fl. Angl.* edit. 2, p. 219 (1778).

R. CUSPIDATA, *M. Bieb. Fl. Taur. Cauc.* i. p. 396 (1808); *Tratt. Mon.* i. p. 121; *Reich. Fl. Excurs.* ii. p. 616; *Déség. Mon.* p. 96, *Toment.* p. 8.

R. ANDRZEIOUSKII, *Steven in Besser, Enum. Volhy.* p. 19; *Tratt. Mon.* i. p. 120; *Déség. Mon.* p. 124, *Toment.* p. 35.

R. HISPIDA, *Borckh. Forst.* ii. p. 1332.

R. BORCKHAUSENII, *Tratt. Mon.* p. 114.

R. PULCHELLA, *Woods, Linn. Trans.* xii. p. 196, *Herb.* 36.

R. TEREBINTHINACEA, *Besser*!, non *Déséglise.*

R. SERINGEANA, *Godr. Fl. Lorr.* edit. 2, p. 255.

R. INSIDIOSA, *Gren. Fl. Jura*, p. 233.

An arching shrub 6 or 8, or even 10 feet high, with elongated branches duller than in the last and not so glaucous. Prickles scattered, uniform, the largest 4–5 lines long, rather stouter downwards than in *mollissima*, and sometimes slightly curved. Fully developed leaves 4–5 inches long, the terminal leaflet elliptical or slightly ovate, more or less rounded at the base, 1½–2 inches long by about three quarters as broad, often more pointed than in *mollissima*, the serratures copiously compound, but generally sharper and not so open, the upper surface thinly grey-downy all over in the typical form, the lower more so, with often, but not always, a few inconspicuous glands scattered over the surface; the stipules copiously gland-ciliated, thinly hairy and glandular on the back; the petiole densely downy and more glandular, with a few scattered aciculi, which are sometimes decidedly hooked. Flowers generally 1 to 3, the peduncle 6–12 lines long, more or less densely aciculate and glanduloso-setose. Corolla bright rose-pink, or not unfrequently pure white, 18–21 lines across when expanded; the petals rarely gland-ciliated. Calyx-tube in the ordinary form oblong, either prickly or naked. Styles hairy. Sepals ascending after the petals fall, densely glandular on the back, $\frac{5}{8}$–$\frac{7}{8}$ inch long, the main ones copiously pinnate, lasting till after the fruit changes colour, but not truly persistent. Fruit ovate-urceolate in the typical form, or sometimes turbinate, 9–12 lines long by 8–9 lines broad, never pendent, ripening in the north of England through September, furnished with a medium-sized disk, like that of *canina*.

This appears to be universally distributed through Britain. I have seen it from Caithness (*R. Dick*) and Sutherland (*Prof. Oliver*), down to Cornwall and Devonshire (*T. R. A. Briggs*) and Sussex (*Borrer*, &c.), and gathered it myself in the Isle of Wight, and up to 550 yards in the north of England. It is spread over both the north and south of Ireland. M. Déséglise refers the three specimens in my fasciculus to three of his species—*tomentosa*, *cuspidata*, and *Andrzeiouskii*. To me they seem to represent fairly what I can only consider a single variety. *Tomentosa* of Déséglise, which is unusually softly grey-downy and nearly destitute of glands, is rarely seen in Britain; *cuspidata*, which is harsher on both sides of the leaf and distinctly glandular beneath, is very common; and *Andrzeiouskii* comes between them. The distribution of the plant in Scandinavia we have stated already. It is common all over Central Europe, both amongst the hills and in the plains, and reaches Spain, Algiers, Asia Minor, and the Caucasus. To this also I refer *R. resinosa*, Déséglise, Herb. Ros. 75 (Billot, Exsic. 360!, non Sternberg), and a Yorkshire plant which Déséglise calls by this name, which is moderately downy and distinctly glandular below. The plants called by Dr. Moore, in 'Cybele Hibernica,' p. 97, *tomentosa* and *scabriuscula*, he has cultivated side by side in the Glasnevin Garden, and found to come true from seed for at least two generations; and yet his *scabriuscula* does not differ from the type nearly as much as the plant just to be described under that name, but is simply a form with white flowers tipped with crimson, and leaves quite as hairy but rather more glandular beneath than usual. The principal varieties in Britain are the following:—

Var. SUBGLOBOSA (*Smith*).

R. SUBGLOBOSA, *Smith, Eng. Fl.* ii. p. 384; *Boreau, Fl. Cent.* edit. 3, no. 882; *Déség. Mon.* p. 99, *Exsic.* 37; *Reut. Cat.* p. 67.

R. SHERARDI, *Davies in E. Fl.* iv. p. 269; *Déség. Toment.* p. 33.

R. SYLVESTRIS, folio molliter hirsuto, fructu rotundo glabro, calyce et pedunculo hispido, *Dillen., Ray, Synop.* edit. 3, p. 478 (1724).

R. TOMENTOSA ε, *Woods, Linn. Trans.* xii. p. 201, *Herb.* 43.

Fruit quite globose; the leaves softly grey-downy on both sides, scarcely at all glandular on the petiole or under surface, the serratures often not so compound as in the type; the flowers in some of the specimens 7–8 in a cluster, and the prickles stouter and a little curved.

Sherard's plant, on which it was founded, was gathered by the Thames-side near Kingston; and I have seen this variety also from the Isle of Wight, Cambridgeshire, Devonshire, Anglesea, Yorkshire, and Northumberland. *R. cinerascens*, Dumort. Mon. p. 50 (*R. velutina*, Chabert) agrees with it in everything except that the serratures of the leaves are quite simple.

Var. FARINOSA (*Rau*).

R. FARINOSA, *Rau, Enum.* p. 147; *Bechst. Forstb.* p. 243; *Tratt. Mon.* p. 103; *Redouté*, 4to edit. t. 52; *Déség. Toment.* p. 17.

A small weak variety, with leaves densely grey-downy when young; petioles slightly glandular; serrations open and copiously compound; fruit obovoid, both it and the short peduncle quite destitute of aciculi and glandular setæ, and main sepals only very slightly compound.

I have Déséglise's authority for referring to Rau's plant one gathered by Mr. Hailstone in Perthshire, near Blair Athol; and that from Redcar, North Yorkshire, gathered by him, and called by Smith, in the 'English Flora,' *villosa*, var. *pulchella*, is very nearly the same. This variety and the last are the forms of *tomentosa* most likely to be confounded with *mollissima*.

Var. SCABRIUSCULA (*Smith*).

R. SCABRIUSCULA, *Smith, Eng. Bot.* t. 1896; *Winch, Geog. Dist.* edit. 2, p. 45 (*ex parte*); *Déséglise, Toment.* 32, non *Woods.*

R. TOMENTOSA *β*, *Woods, loc. cit., Herb.* 40.

R. COLLINA, *Fries, Herb. Norm.* vi. 42, non *Jacq.*

The plant intended by Smith under this name differs from the type by having the leaves less hairy, and, consequently, greener and harsher. They are often very nearly naked on the upper surface when mature, and are hairy principally on the ribs beneath, and scarcely at all glandular. The prickles are straight and slender, and the fruit ovate and usually densely aciculate. This is a widely dispersed variety; but many of Winch's specimens, and the plant described by Woods, do not belong to it. On this point I quite indorse Smith's remarks in the 'English Flora,' vol. ii. p. 384. Lindley's var. *resinosa* (Monog. p. 77) is essentially the same, with deep-coloured flowers, very narrow leaves, and very sharp compound teeth.

Var. SYLVESTRIS, *Woods.*

R. TOMENTOSA, var. SYLVESTRIS, *Woods, loc. cit Herb.* 49, 50.

R. SYLVESTRIS, *Lindl. Synops.* p. 101, non *Reich.*

R. JUNDZILLIANA, *Baker, Review,* p. 21, *Exsic.* 11, but scarcely of Besser.

R. BRITANNICA, *Déséglise, MSS.*

Prickles stouter than in the type, and slightly curved. Leaves naked above when mature, thinly hairy, and conspicuously glandular beneath, with densely glanduloso-setose hairy petioles; stipules and bracts slightly hairy and glandular on the back; peduncles and ovate fruit densely aciculate and glanduloso-setose.

I now believe my *Jundzilliana* to be essentially the same as Lindley's *sylvestris*, and not worth regarding as more than a variety of *tomentosa.* Mr. Webb's original Cheshire plant had robust uncinate prickles, flowers often 6–10 in a cluster and broad cordate leaflets, recalling the aspect of the *Gallicanæ* group; but the average of the variety, as represented in my fasciculus, differs principally from *scabriuscula* by the leaves being considerably glandular beneath.

Var. OBOVATA, *Baker.*

Prickles uncinate; leaflets obovate-oblong, with a subdeltoid base and very deep and compound upper teeth, grey-green, soon quite naked on the upper surface, thinly hairy and glandular beneath; the petiole densely downy, but not glanduloso-setose;

the peduncles very short and quite hidden by the large sheathing bracts, which are nearly naked on the back, but glandular towards the edge; both the peduncle and glaucous oblong calyx-tube quite naked, and the sepals naked on the back.

Durham, by the side of the highroad a little out of Eglestone going towards Middleton in Teesdale. A connecting link between *tomentosa* and *pulverulenta*.

Group. 3. RUBIGINOSÆ.

8. **R. RUBIGINOSA**, *Linn.* Frutex mediocris, ramis brevibus ascendentibus, aculeis subsparsis majoribus falcatis modice robustis aciculis paucis subrectis inæqualibus intermixtis, foliolis mediocribus copiose duplicato-serratis supra mox glabris, infra leviter pubescentibus et copiose odorato-glandulosis, floribus 1 vel paucis, pedunculis dense aciculatis, sepalis ascendentibus dorso dense glandulosis majoribus copiose pinnatis subpersistentibus, stylis villosis, fructibus globosis serotinis plerisque aciculatis, disco angusto.

R. RUBIGINOSA, *Linn. Mant.* ii. p. 564; *Smith, Eng. Fl.* ii. p. 385; *Lindl. Mon.* p. 86, *a* et *γ*; *Borrer in Brit. Fl.* edit. 3, p. 237; *Fries, Herb. Norm.* vi. 41; *Déséglise, Mon.* p. 109.

R. EGLANTERIA, *Woods, Linn. Trans.* xii. p. 206, *Herb.* 61–66.

R. UMBELLATA, *Leers, Herb.* p. 117; *Déség. Mon.* p. 111; *Reut. Cat.* p. 72; *Billot, Exsic.* 3596; *Wirtg. Exs.* 470.

R. ECHINOCARPA, *Ripart, Déség. Mon.* p. 110; *Wirtg. Exs.* 742.

R. COMOSA, *Ripart, Schultz's Archiv.* p. 254; *Déség. Mon.* p. 113, *Exsic.* 35; *Billot, Exsic.* 3597.

A bush 3 to 5 feet high, the main stem scarcely arching, and the branches short and straight. Main prickles scattered, 3–4 lines long, falcate and much thickened downwards, often mixed with a few straight slender unequal aciculi. Stipules densely glandular, but nearly destitute of hairs on the back. Well-developed leaves of the barren shoot 2½–3 inches long, with seven leaflets, the terminal one broad-oblong or obovate, 9–12 lines long by three-quarters as broad; the serratures open and copiously compound, the upper surface nearly naked or finally quite so, the lower densely covered all over with fragrant glands, thinly hairy on the ribs; the petiole densely glanduloso-setose and thinly hairy, usually furnished with numerous unequal aciculi, the larger ones strongly hooked. Bracts often ¼ inch broad, nearly naked on the back. Flowers usually 1–4; the peduncles generally under ½ inch long, densely clothed with glandular setæ and strong aciculi. Calyx-tube subglobose or broad ovate-urceolate, usually aciculate. Corolla generally full rose, 12–15 lines across when expanded. Styles densely villose. Sepals densely glandular on the back, the larger ones 7–8 lines long, slightly leaf-pointed, with 2–3 pairs of spreading linear pinnæ, not falling till after the fruit changes colour, which is not till October or late in September. Ripe fruit subglobose, measuring about ½ inch each way.

This, the common Sweet-briar of gardens, is a plant of such long-standing cultivation that it is very difficult to judge at the present time which are its really wild stations. It is plainly indigenous amongst the chalk-hills of the south of England, but in the north of England, though tolerably plentiful in hedges in some districts (as, for instance, round the foot of the Cheviots near Wooller), I have never seen it amongst the cliffs or in the aboriginal woods of the mountain-valleys, like *canina*, *tomentosa*, and *mollissima*. I have seen specimens from as far north as Perth and Inverness. Messrs. Moore and More do not claim it with any confidence as a native of Ireland. It is common as a truly wild plant in Central Europe, extending to Teneriffe, Greece, Tauria, and Persia. After the study of numerous authenticated specimens, I cannot draw any line of distinction between the plants quoted as synonyms.

Var. PERMIXTA (*Déséglise*).

R. PERMIXTA, *Déség. Mon.* p. 107, *Exsic.* 72.

R. MICRANTHA, var. PERMIXTA, *Gren. Fl. Jura*, p. 252; *Dumort. Ros. Belg.* p. 55.

Leaves in our plant quite without hairs, but as densely glandular on the under surface and petiole as in the type; styles quite glabrous; fruit ovate-urceolate, half as long again as broad, and decidedly narrowed at the neck, densely prickly, the sepals fallen before it reddens.

Surrey, bank of the valley in which *Teucrium Botrys* grows on Box Hill (*Borrer*!). This recedes from the type towards *micrantha* by the naked styles and shape of the fruit, but in other respects agrees with the type.

Var. SYLVICOLA (*Déség. et Ripart*).

R. SYLVICOLA, *Déség. et Ripart, MSS.*!

Bush laxer and not so strongly scented as in the type, prickles more slender, leaflets larger, thinly hairy beneath, the glands fewer and finer, the fruit broad ovate-urceolate, the styles hairy.

North Yorkshire, road-side near Low Row, Swaledale, *James Backhouse* and *J. G. Baker.*

9. R. MICRANTHA, *Smith.* Frutex mediocris, ramis elongatis arcuatis, aculeis sparsis conformibus falcatis deorsum robustis, foliolis mediocribus copiose duplicato-serratis, supra mox glabris, infra leviter pubescentibus prorsus glandulosis, floribus 1 vel paucis, pedunculis dense aciculatis, sepalis ascendentibus, subpersistentibus dorso glandulosis majoribus apice foliaceis paullulum pinnatis, stylis glabris, fructibus ovato-urceolatis serotinis plerisque subnudis discis mediocribus instructis.

R. MICRANTHA, *Smith, Eng. Bot.* 2490 (1812), *Eng. Flora,* ii. p. 387; *Woods, Linn. Trans.* xii. p. 209, *Herb.* 67, 68; *Borrer, Brit. Fl.* edit. 3, p. 236; *Gren. Fl. Jura,* p. 251; *Reut. Cat.* p. 71; *Dumort. Ros. Belg.* p. 54, *ex parte, non DC. Fl. Franç.* v. p. 539, *nec Déség. Mon.* p. 115.

R. NEMOROSA, *Libert in Lej. Fl. Spa,* ii. p. 80 (1813); *Boreau, Fl. Cent.* edit. 3, vol. ii. p. 229; *Déség. Mon.* 114; *Billot, Exsic.* 3598.

R. FLORIBUNDA, *Steven in Bess. Cat. Crem. Suppl.* iv. p. 19 (1819); *Bieb. Fl. Taur. Cauc.* iii. p. 343; *DC. Prodr.* ii. p. 621.

R. LIBERTIANA, *Tratt. Mon.* ii. p. 80.

R. RUBIGINOSA, var. MICRANTHA, *Lindl. Mon.* p. 87.

A taller and laxer bush than the last, generally, but not always, without any decided Sweet-briar fragrance. Prickles scattered and quite uniform, those of the main stem 3–5 lines long, decidedly falcate and thickened downwards; the scar 4–6 lines deep. Stipules varying from naked to densely glandular on the back, copiously glanduloso-ciliated. Well-developed leaves 2½–3 inches long, with 7 leaflets, the terminal oblong or with an obovate tendency, 12–15 lines long by 9–12 lines broad, more pointed than in *rubiginosa,* the serrations rather sharper, copiously compound, the upper surface nearly naked, when old quite so; the lower surface scattered all over with fine but conspicuous glands; the aciculi of the petiole usually 2–4 only and subequal. Bracts densely gland-ciliated, but often nearly naked on the back. Peduncles longer than in *rubiginosa,* densely aciculate and glanduloso-setose. Calyx-tube narrowly ovate-urceolate, often naked. Petals pale rose, the expanded corolla not much over an inch across. Styles glabrous. Sepals densely glandular on the back, the main ones ½–⅝ inch long, more leafy at the point than in *rubiginosa,* but with only 1–2 pairs of minute pinnæ, spreading after the petals fall, falling when the fruit has changed colour. Fruit bright scarlet, ovate-urceolate, 7–8 lines long by 5–6 lines broad, with a decided disk like that of *canina*, changing colour late in September or early in October.

This differs from *rubiginosa* by its laxer habit of growth, faint odour, uniform prickles, glabrous styles, and in the character of the fruit and sepals, and may be considered midway between *rubiginosa* and *canina*. In some parts of the Isle of Wight it is as plentiful as *canina*; it is a plant of the Channel Islands (*Rev. T. Salwey* !); Mr. Borrer gathered it in many places in Sussex, and Mr. Briggs in Devon and Cornwall; and it extends northward to Anglesea (*Wilson* !, *Borrer* !, *Webb* !), Cheshire (*Webb* !), Yorkshire (*Hailstone* !, *Baker*), and to Northumberland (Buston, near Alnwick, *J. Chrisp* !). In Ireland it appears to be restricted to the neighbourhood of Cork, whence I have seen specimens gathered by Mr. Isaac Carroll; but Dr. Mackay's plant thus labelled was *rubiginosa*. On the Continent it is not known in Scandinavia, but it begins in Belgium and is diffused through France to Geneva, and eastward as far as Tauria, whence there is a specimen from Steven in the Kew herbarium.

Var. BRIGGSII, *Baker*.

A luxuriant variety with leaflets 15–18 lines long, 10–12 lines broad, naked above, less glandular than in the type beneath; calyx-tube and fruit shorter and stouter, and, like the peduncle, quite naked; sepals more pinnate and scarcely glandular on the back.

Devonshire, quarry at Rumple, near Plymouth (*Briggs* !).

Var. HYSTRIX (*Leman*).

R. HYSTRIX, *Leman, Bull. Phil.* 1818, extr. p. 18; *Boreau, Fl. Cent.* edit. 2, vol. ii. p. 182, *non Lindl. Mon.* p. 129, t. 17 (1820).

R. LEMANII, *Boreau, Fl. Cent.* edit. 3, vol. ii. p. 230; *Déség. Mon.* 102, *Exsic.* 71.

R. MICRANTHA, var. LEMANII, *Dumort. Mon.* p. 55.

A small variety with narrow sharply toothed leaves, densely glandular beneath, but quite without hairs; terminal leaflet cuneate at the base; peduncle densely aciculate; calyx-tube naked.

Surrey, Boxhill; and Oxfordshire, Caversham (*Borrer* !); Gloucestershire, St. Vincent's rocks (*Dr. St. Brody* !)

In leaves and general habit very like *R. sepium*; but the sepals are glandular on the back, and the peduncle densely aciculate.

10. R. PULVERULENTA, *M. Bieb.* Frutex mediocris, ramis elongatis arcuatis, aculeis sæpe subinæqualibus, majoribus falcatis robustis, foliolis obovatis copiose duplicato-serratis, supra cito glabris, infra tenuiter pubescentibus prorsus glandulosis, floribus 1 vel paucis, pedunculis nudis vel raro aciculatis, sepalis ascendentibus subpersistentibus dorso nudis vel leviter glandulosis, majoribus copiose pinnatis, stylis hirsutis, fructibus nudis serotinis ovato-urceolatis vel rotundatis discis mediocribus instructis.

R. PULVERULENTA, *M. Bieb. Fl. Taur.-Cauc.* i. p. 399 (1808); *Lindl. Mon.* p. 93; *DC. Prodr.* ii. p. 617.

R. INODORA, *Fries, Novit.* i. p. 9 (1814); *Herb. Norm.* x. 51, *non Auct. Angl.*

R. INODORA γ, *Borrer, in Brit. Fl.* 3rd edit. p. 235 (*non* α et β).

R. KLUKII, *Besser, Hort. Crem.* 1816, p. 118; *M. Bieb. Fl. Taur.-Cauc.* iii. p. 346; *Tratt. Mon.* ii. p. 70; *Wim. et Grab. Fl. Sil.* ii. p. 89; *Gren. Jura,* p. 248; *Déség. Mon.* p. 100, *Exsic.* 29; *Billot, Exs.* 1665.

R. SEPIUM β. KLUKII, *Reut. Cat. Gen.* p. 73.

R. GRANDIFLORA, *Wallr. Ann. Bot.* p. 66; *Roth, Enum.* p. 451.

R. BALSAMEA, *Besser, Cat. Hort. Crem.* 1815.

R. IBERICA, *Steven, M. Bieb. Fl. Taur.-Cauc.* iii. p. 345; *DC. Prodr.* ii. p. 617.

A taller and stronger bush than *micrantha,* with a similar habit. Prickles uniform, or with a few setaceous aciculi intermixed, the larger ones 3–4 lines long, robust, falcate. Well-developed leaves of the barren shoot 3–3½ inches long, with 7 leaflets, the terminal one obovate-oblong, 15–18 lines long by three-quarters as broad, or rather less, thicker in texture than in *micrantha*, soon quite naked above, slightly on the ribs only but with glands scattered all over the surface beneath; the upper serratures sharp, deep, and copiously compound; the petiole densely setose, slightly hairy, with several unequal aciculi. Bracts 3–4 lines broad, naked on the back, or nearly so. Flowers usually 1–3; the peduncle 4–6 lines long, usually naked; the calyx-tube oblong, naked. Sepals 8–9 lines long, naked or slightly glandular on the back, ascending after the petals fall, subpersistent, the main ones copiously pinnate. Flowers pink, 15–18 lines across. Styles hairy. Fruit ovate-urceolate, as large as that of *canina,* and with a similar disk, not ripening till October or late in September.

This is very near *micrantha,* but is a stronger plant, quite as glandular, but larger in its leaves and flowers, with hairy styles, more compound sepals, the peduncle typically naked, and the sepals naked on the back. I have seen it only from four counties in Britain:—Somersetshire, woods at Brean Down (*Woods*!); Yorkshire, Richmond (*Jas. Ward*!); Durham, Ravensworth woods (*Robertson*!); and Northumberland, gathered by myself in two places near Wooller. On the other hand, it closely resembles *R. Borreri*; but in that the leaves are only very faintly or not at all glandular below, with the lower half broader, the peduncles aciculate, and the sepals reflexed and deciduous. I have seen a specimen of the Taurian plant from Steven, and of Lindley's from Lyell, and cannot trace any material difference between these and ours and the Scandinavian, French, and Swiss examples labelled with the names I have quoted. Koch, Ledebour, and Reuter agree in uniting it with the common South-European *R. sepium*, Thuill., which is smaller in all its parts, with the leaves entirely without hairs and narrowed to both ends, glabrous styles, and slender ovate-urceolate fruit.

Var. BILLIETII (*Puget*).

R. BILLIETII, *Puget in Billot, Exsic.* 3594.

R. VAILLANTIANA, *Boreau, MSS.*!

R. SEPIUM, *Borrer, E. B. S.* t. 2653. *Brit. Fl.* edit. 3, p. 238, *non Thuil.*

R. SEPIUM δ, *Rapin, Vaud Guide*, edit. 2, p. 199.

Prickles of the main stem decidedly unequal, the main ones as large and as strong as those of the type, but only slightly hooked. Leaflets smaller; the terminal one 9–12 lines long by three-quarters as broad, obovate, with a subdeltoid base; the upper surface at first slightly hairy, the lower thinly hairy and finely glandular all over. Peduncle naked; calyx-tube narrowly ovate-urceolate; the sepals, like those of *micrantha*, lengthened out at the point, but only sparingly pinnate; the styles hairy; the fruit ovate-urceolate, 7–8 lines deep.

In Britain I have seen this only from Allesley in Warwickshire, where it was gathered by the Rev. W. T. Bree; but I have authenticated specimens, under the three names I have quoted, from Savoy. From the true *sepium* *, which is very widely diffused throughout the south of Europe, it differs by its leaves thinly hairy and not so densely glandular beneath, not narrowed in the upper half, villose styles, and stouter fruit. It comes very near *R. lugdunensis*, Déség. Mon. p. 101, which has leaves less hairy but more glandular beneath, shorter peduncles and round fruit.

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* I gathered in the summer of the present year, on the south slope of Hind Head in Surrey, a plant differing only from the typical *sepium* by having the leaves very slightly hairy on the petiole and midrib beneath. This should now therefore be placed as the type of the species, and the other forms described as its varieties.

Var. CRYPTOPODA, *Baker*.

R. CRYPTOPODA, *Baker, Review*, p. 22.

Prickles rather unequal, the large ones uncinate and robust. Leaflets ovate-oblong, the terminal one about an inch long by three-quarters as broad; the upper surface glaucous green, naked; the lower thinly glandular all over, hairy on the main veins; the petiole hairy and glanduloso-setose, with 2–4 hooked aciculi. Bracts and stipules glandular on the back, but scarcely hairy. Peduncle very short, quite naked. Fruit subglobose, 7–8 lines each way. Sepals naked on the back; the main ones 8–9 lines long, copiously pinnate.

West Yorkshire, Luddenden, near Halifax, *S. King*!

Very near *R. virgultorum*, Ripart in Desegl. Exsic. 32, which has similar peduncles, fruit, and sepals, but leaves more decidedly glandular beneath, but not at all hairy, and less hairy styles.

Group 4. CANINÆ.

11. **R. CANINA, *Linn*. Frutex altus, ramis elongatis arcuatis, aculeis sparsis æqualibus robustis falcatis, foliolis simpliciter vel duplicato-serratis utrinque glabris eglandulosis vel præcipue infra tenuiter pubescentibus, floribus 1 vel paucis, pedunculis plerisque nudis, sepalis dorso plerisque nudis reflexis deciduis, vel interdum ascendentibus subpersistentibus, majoribus copiose pinnatis, stylis plus minus hirsutis, fructibus ovato-urceolatis vel rotundatis (plerisque serotinis) discis conspicuis instructis.**

Series 1. Ecristatæ. *Leaves not glandular beneath. Fruit very hard when green, not ripening till October or the latter part of September; the sepals still remaining reflexed after the petals fall, and becoming disarticulated before it changes colour.*

* *Peduncles not aciculate; leaves glabrous on both sides.*

Var. LUTETIANA (*Leman*).

R. LUTETIANA, *Leman, Bull. Phil.* 1818, extr. p. 9; *Baker, Review*, p. 25, *Exsic.* 12.

R. CANINA, *Linn. Herb.*! *Woods, Linn. Trans.* ix. p. 233 (excl. var. δ), *Herb.* 108–111, 115, 116; *Smith, Engl. Fl.* ii. p. 394; *Déség. Mon.* p. 61, *Exsic.* 12; *Reut. Gen.* p. 69; *Dum. Belg.* p. 59.

R. NITENS et GLAUCESCENS, *Desv. in Mérat, Fl. Paris,* p. 192.

R. SWARTZIANA et AFZELIANA, *Fries, Fl. Hall.* pp. 86, 87.

R. FALLAX, *Puget in Déség. Exsic.* 60.

An arching bush often 10 or 12 feet high, with elongated arching branches. Prickles scattered, uniform, falcate, very robust, 3–5 lines long, and the scar as deep. Stipules quite naked on both sides, and only slightly gland-ciliated. Fully developed leaves of the barren shoot 3–4 inches long, with 7 leaflets; the terminal one obovate-oblong, 15–18 lines long by about three-quarters as broad; both sides quite naked, green or glaucous; the serration sharp and simple; the teeth often quite glandless; the petiole with 2–4 hooked aciculi, but without hairs or glandular setæ. Flowers 1–4, on naked peduncles generally more than half an inch long; the corolla pinkish, 18–24 lines broad. Styles moderately hairy. Fruit ovate-urceolate, 7–9 lines long, not changing colour till October in the north, or late in September in the south of England. Sepals $\frac{5}{8}$–$\frac{3}{4}$ inch long, naked on the back, but little gland-ciliated, the main ones copiously pinnate.

In the broad sense of the term, as here defined, *R. canina* is universally dispersed through Britain, including Ireland, and is in most districts far more common than any other Rose, or than all the others put together. In the north of England it reaches an altitude of 450 yards. It extends everywhere through Europe except Lapland and Finland, and reaches the Canaries, Barbary, Persia, and Siberia. Of the varieties here described, *lutetiana*, *dumalis*, and *urbica*, with intermediates between them, are the most common in Britain, all the others being much less frequent. Of this, the names *glaucescens* and *Afzeliana* refer especially to the plant with glaucous leaves. *R. Malmundariensis*, Lej. Fl. Spa, i. p. 231, a modification of this variety with sepals glandular on the back, has been gathered by Rev. W. H. Purchas in Derbyshire.

Var. SURCULOSA (*Woods*).

R. SURCULOSA, *Woods, Linn. Trans.* xii. p. 228, *Herb.* 117–121.

A very robust form, like the last, but with flowers often 10–12 (I have seen 20–30) in a cluster, flat leaflets broadly rounded at the base and with more open teeth; the young shoots and leaves often suffused with red.

Apparently confined to the south of England.

Var. SPHÆRICA (*Gren.*).

R. SPHÆRICA, *Gren. in Billot, Archiv.* p. 333, *Exsic.* 1479; *Déség. Mon.* p. 64; *Gren. Jura,* p. 241; *Reut. Cat.* p. 70.

R. CANINA, var. SPHÆRICA, *Dumort. Belg.* p. 60.

Differs only from *lutetiana* by its broader leaflets, more rounded at the base, slightly pubescent petioles, globose fruit 7–8 lines broad and deep, and more villose styles.

A plant gathered by Mr. Briggs at Modoney, in Devonshire, quite agrees with what I have under this name from Besançon and Geneva.

Var. SENTICOSA (*Ach.*).

R. SENTICOSA, *Ach. Vet. Acad. Handl.* 1813, p. 91, t. 13.

R. ACIPHYLLA, *Rau, Enum.* p. 69, cum icone; *Tratt. Mon.* ii. p. 22; *Déség. Mon.* p. 66.

R. SPHÆRICA, var. ACIPHYLLA, *Gren. Jura,* p. 242.

Fruit perfectly globular, but much smaller than in the last; the general habit of the plant very slender and flexuous, the fully developed leaves not more than an inch long by 6–7 lines broad; the teeth very acute. "It has the aspect of *R. sepium*, but the petioles and leaflets are glandless."—*Déséglise.*

Devonshire, hedge near Yeo, *Briggs*!

Var. DUMALIS (*Bechst.*).

R. DUMALIS, *Bechst. Forst.* p. 241 (1810); *Tratt. Mon.* ii. p. 24, *Gren. Jura,* p. 214; *Baker, Review,* p. 25, *Exsic.* 13–15.

R. STIPULARIS, *Mérat, Fl. Paris,* p. 192; *DC. Prodr.* ii. p. 623.

R. SARMENTACEA, *Swartz, MSS.*; *Woods, Linn. Trans.* xii. p. 213, *Herb.* 79–84; *Smith, Engl. Flora,* ii. p. 390; *Borrer, E. B. S.* t. 2595.

R. VENOSA, *Swartz, MSS.*; *Spreng. Syst.* ii. p. 544; *DC. Prodr.* ii. p. 623.

R. GLAUCOPHYLLA, *Winch, Geog. Distr.* p. 45.

R. GLAUCA, *Lois. Not.* p. 80.

R. RAMULOSA, *Godr. Fl. Lorr.* edit. 2, vol. i. p. 231.

R. CANINA, var. DUMALIS, *Dumort. Belg.* p. 60.

R. CANINA, var. SARMENTOSA, *Reut. Cat.* p. 70.

Stipules more densely gland-ciliated than in the type; teeth of the leaves more or less compound, with the secondary serrations gland-tipped; the petiole more or less glanduloso-setose and often a little hairy; the sepals also gland-ciliated, and the flowers sometimes deeper in colour.

A very common form, also either green or glaucous; the latter *venosa*, Sw., and *glaucophylla*, Winch. Specimens gathered in Northumberland (*Baker*, Exsic. 15) and Leicestershire (*Bloxam*!) with sepals glandular on the back; and a plant in Durham, near Darlington (*Jas Ward*!), exactly accords with *R. Malmundariensis*, Déség. Exsic. 48, with round fruit and numerous flowers in a cluster.

Var. BISERRATA (*Mérat*).

R. BISERRATA, *Mérat, Fl. Par.* p. 190; *Leman, Bull. Phil.* 1818, extr. p. 9; *Tratt. Mon.* ii. p. 33; *Déség. Mon.* p. 72; *Gren. Jura*, p. 245; *Reut. Cat.* p. 70.

R. CANINA, var. BISERRATA, *Dumort.* p. 61.

R. VINACEA, *Baker, Review*, p. 32, *Exsic.* 28.

R. SEPIUM, var. NITENS, *Desv. Journ. Bot.* ii. p. 117.

Scarcely different from the last, but the serratures open and very compound, the petioles more glanduloso-setose, and the glands extending a little to the midrib beneath. Déséglise's plant has globose fruit; my *vinacea* has oblong fruit, narrow sharp-pointed leaves and bracts, branches and stipules suffused with vinous red.

*** Peduncles not aciculate; leaves naked above, hairy only on the ribs beneath.*

Var. URBICA (*Leman*).

R. URBICA, *Leman, Bull. Phil.* 1818, extr. p. 9; *Déségl. Mon.* p. 84, *Exsic.* 22; *Baker, Review*, p. 26, *Exsic.* 16.

R. COLLINA, var. URBICA, *Dumort. Belg.* p. 58.

R. COLLINA β et γ, *Woods, Linn. Trans.* xii. p. 219, *Herb.* 96, 98–103.

R. FORSTERI, *Smith, Eng. Flora*, ii. p. 392 (1824); *Borrer, E. B. S.* t. 2611.

R. RAMEALIS, *Puget in Déség. Exsic.* 66.

General habit, leaves, and fruit of *lutetiana*; but the grey or green simply toothed leaves thinly hairy on the under surface; the serration sharp and simple; the petiole densely pubescent, but scarcely at all glanduloso-setose; the fruit oblong or ovate-urceolate, rarely subglobose.

A very common variety, from which *R. platyphylla*, Rau, Enum. p. 82 (*R. opaca*, Gren. in Billot, Archiv. p. 332, Exsic. 1748), only differs by its larger grey-green leaves more rounded at the base, and large subglobose fruit.

Var. FRONDOSA (*Steven*).

R. FRONDOSA, *Steven, MSS.* ! *Spreng. Syst. Veg.* ii. p. 544.

R. DUMETORUM, *Woods, Herb.* 93.

Differs from the last by its small flat ovate-oblong leaflets much rounded at the base, and small subglobose fruit.

Yorkshire (*Hailstone* !), Sussex (*Borrer* !), Isle of Wight (*Baker*). Very near *obtusifolia*, Desv. Journ. Bot. ii. p. 317 (*R. leucantha*, Bast. Suppl. Fl. Maine-et-Loire, p. 32), but the leaflets naked above and less hairy below.

Var. ARVATICA, *Baker*.

R. ARVATICA, *Baker, Review*, p. 33, *Exsic.* 25–27, *non Puget.*

R. TRACHYPHYLLA, var. ARVATICA, *Dumort. Belg.* p. 59.

R. CILIARIS, *Wils. MSS.* (*in herb. Borrer*).

Bears much the same relation to *urbica* that *dumalis* does to *lutetiana*. Leaflets obovate-oblong, naked above, hairy on the ribs below; the serratures copiously compound; the accessory teeth gland-tipped; the petioles densely pubescent and glanduloso-setose, and the glands often extending to the midrib beneath; the bracts, stipules, and sepals copiously gland-ciliated. Fruit ovate.

A common form in the north of England. It is the Warrington Rose mentioned by Mr. Borrer in the 'British Flora,' edit. 3, p. 241. Mr. Robertson labels it "midway between *canina* and *inodora*." I have gathered it in North Yorkshire with sepals glandular on the back.

*** *Peduncles not aciculate. Leaflets more or less hairy on both sides.*

Var. DUMETORUM (*Thuill.*).

R. DUMETORUM, *Thuill. Par.* p. 250; *Fries, Herb. Norm.* viii. p. 43; *Déség. Mon.* p. 82; *Baker, Review*, p. 27, *Exsic.* 19.

R. DUMETORUM *α*, *Gren. Jura*, p. 247.

R. COLLINA, *DC. Fl. Franç.* iv. p. 441; *Wahl. Suec.* 563, *non Jacq.*

R. SOLSTITIALIS, *Besser, Prim. Fl. Gall.* p. 324 !

R. SUBMITIS, *Gren. Schultz's Archives*, p. 332; *Billot, Exsic.* 1476.

Stipules and bracts hairy on the back, but little gland-ciliated. Leaflets grey-green, softer in texture than in the foregoing forms, and sooner destroyed by frost; the terminal one often 18–21 lines long by an inch broad, broadly rounded (or even cordate) at the base, softly hairy all over beneath, and thinly so above when old; the serratures simple and moderately open; the petioles densely grey-pubescent, scarcely at all glanduloso-setose, and sometimes without prickles. Flowers often deeper in colour than the preceding. Fruit large, generally ovate-urceolate, not so hard when green, and ripening earlier than in the foregoing varieties, and the sepals often not fully reflexed. Styles villose*.

Principally in the north of England. *R. uncinella*, Besser, is a montane form with firmer leaves, less hairy above, and large subglobose fruit.

Var. PRUINOSA, *Baker*.

R. PRUINOSA, *Baker, Review*, p. 27.

R. CÆSIA, *Borrer, Brit. Flora*, edit. 3, p. 242 (*ex parte*).

Like the last, but very glaucous, the serrations laxer and compound, the secondary teeth gland-tipped, and petioles slightly glandular.

Northumberland, Durham, and Yorkshire amongst the hills. A form with sepals glandular on the back, by the Swale, near Keld, and a similar plant gathered in Derry by Dr. Moore.

Var. INCANA, *Woods*.

R. TOMENTOSA, var. INCANA, *Woods, Linn. Trans.* xii. p. 203, *Herb.* 59.

R. CÆSIA, var. INCANA, *Borrer, in Brit. Flora*, 3rd edit. p. 242.

Leaflets of average size, narrowly ovate-oblong, very glaucous, and slightly downy above, densely downy and with a few inconspicuous scattered glands beneath; the serration copiously compound, the secondary teeth gland-tipped; the petiole both pubescent and setose; the peduncle slightly hairy; the styles densely villose; the fruit large and oblong; the sepals not falling so soon as usual.

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* "*R. dumetorum* inter *R. caninam* et *coriifoliam* exacte media est. Millena et varia circa Upsaliam videre licet *R. caninæ* et *dumetorum* individua, facillime vero semper ad suam speciem referenda, quare Ill. Wahlenberg, plantas ipsas nec characteres modo respiciens, tam in Fl. Upsaliensi quam Suecica distinxit, et quanto diutius ejus vestigia repetii, tanto magis ad hanc sententiam inclino."—FRIES, *Summa*, p. 172–173.

Gathered in Forfarshire by G. Don. *R. canescens*, Baker, Review, 28, *Exsic.* 20, is a form with similar leaves, but with the fruit and sepals of the type.

Var. TOMENTELLA, *Leman.*

R. TOMENTELLA, *Leman, Bull. Phil.* 1818, extr. p. 10; *Déség. in Billot's Archiv.* p. 334, *Exsic.* 1477; *Déség. Monog.* p. 92, *Exsic.* 70; *Baker, Review,* p. 33, *Exsic.* 29; *Dumort. Belg.* p. 56; *Reut. Cat.* 71; *Gren. Jura,* p. 247.

R. TOMENTOSA γ. DUMETORUM, *Gaud. Fl. Helv.* iii. p. 352.

R. RUBIGINOSA, var. C, *Rapin, Cat. Vaud.* p. 101.

R. INODORA, *Hook. Fl. Lond.* n. s. t. 117?

Branches green and very flexuous; prickles very strongly hooked; fully developed leaflets under an inch long, flat, ovate-oblong, rounded at the base, green and thinly hairy above, hairy all over and sometimes with a few inconspicuous glands beneath; the petioles hairy and glanduloso-setose, with 3–4 strongly hooked aciculi; peduncles shorter than usual and often quite hidden by the bracts; flowers smaller and very pale; styles densely hairy; fruit small ($\frac{1}{2}$–$\frac{5}{8}$ inch long), subglobose or broad ovate-urceolate, very late in ripening.

I have gathered this in many parts of England, from the Isle of Wight northward to Northumberland, and received it from nearly all my correspondents; and yet it does not seem to have been known to either Woods or Borrer. Déséglise, Grenier, and Reuter all classify it with the *Rubiginosæ*; but the glands beneath are so few and faint as to be scarcely visible except with a lens. For a full account of its modifications, see a paper by Crepin in the Bulletin of the Royal Botanical Society of Belgium, v. p. 26.

**** *Peduncles more or less aciculate and glanduloso-setose.*

Var. ANDEVAGENSIS (*Bast.*).

R. ANDEVAGENSIS, *Bast. Fl. Maine-et-Loire* (1809), p. 189; *DC. Fl. Franç.* v. p. 539; *Déség. Mon.* p. 75, *Exsic.* 17, 18; *Reut. Cat.* p. 70; *Baker, Review,* p. 31.

R. CANINA, var. ANDEVAGENSIS, *Dumort.* p. 60.

R. RAUII, *Tratt. Mon.* ii. p. 35.

R. SEMPERVIRENS, *Rau, Enum.* p. 120, *non L.*

R. CANINA, var. GLANDULIFERA, *Woods, Linn. Trans.* xii. p. 223, *Herb.* 112–114.

Differs from *lutetiana* only by its aciculate peduncles.

Not unfrequent, especially in the south of England. A form with sepals glandular on the back, from the Pass of Lanrick, Perthshire (*Borrer* !), Braemar (*Watson* !), and Caernarvonshire (*Bloxam* !).

Var. VERTICILLACANTHA (*Mérat*).

R. VERTICILLACANTHA, *Mérat, Fl. Par.* p. 190; *DC. Prodr.* ii. p. 622; *Déség. Mon.* p. 67; *Baker, Review,* p. 31.

R. DUMALIS, var. GLANDULOSA, *Gren. Jura,* p. 215.

Bears the same relation to *dumalis* that the last does to *lutetiana.*

Not uncommon. Extreme specimens with the calyx-tube prickly as well as the peduncle, and sepals glandulous on the back, gathered in Somersetshire near Bridgewater (*T. Clark* !) and Weston-super-mare (*Woods* !), and in Devonshire (*Briggs* !). *R. psilophylla,* Rau, Enum. p. 101, only differs from this by its hairy petioles.

Var. COLLINA, *Jacq.*

R. COLLINA, *Jacq. Austr.* t. 197; *Tratt. Mon.* ii. p. 2; *Déség. Mon.* p. 89; *Baker, Seem. Journ.* iii. p. 82.

R. COLLINA α et β, *Dumort. Belg.* p. 57.

R. CAMPESTRIS, *Swartz, MSS.*; *Fries, Fl. Halland.* p. 86.

R. KOSINCIANA, *Besser, Enum. Volh.* p. 60; *Tratt. Mon.* ii. p. 48; *Déség. Mon.* p. 76.

R. TORTUOSA, *Wierzb. in Reich. Exsic.* 1751.

R. UMBELLATA, *Libert, in Lej. Fl. Spa,* ii. p. 313.

The representative of *urbica* in this group. As gathered by Mr. Borrer in Surrey and Mr. Briggs near Plymouth this has numerous flowers in a cluster, and flat leaves broadly rounded at the base with moderately open serrations; but the commoner form is, like ordinary *urbica,* less robust, with narrower more sharply toothed leaves.

Var. CÆSIA (*Smith*).

R. CÆSIA, *Smith, Engl. Bot.* t. 2637; *Woods, Linn. Trans.* xii. p. 212, *Herb.* 78; *Borrer, Brit. Flora,* edit. 3, p. 242 (*ex parte*).

Very near the last, the leaves grey-green, softly hairy beneath and slightly so on the upper surface, the teeth slightly compound. Petiole slightly glanduloso-setose. Stipules and bracts pubescent on the back. Sepals glandular on the back.

Drawn for 'English Botany' from Taynuilt, Argyle (*Borrer* !). Gathered also in Derbyshire by the Rev. W. M. Hind and Rev. W. H. Purchas, in Leicestershire by the Rev. A. Bloxam, and by myself in Northumberland near Wooller.

Var. CONCINNA, *Baker*.

Prickles very much hooked. Leaflets very small, the terminal one 8–9 lines long, flat, broad obovate, thinly downy above when young, hairy all over beneath; the teeth simple, moderately open; the petioles pubescent, but scarcely at all setose; the calyx-tube small, broad ovate; the styles slightly protruded, thinly hairy.

Devonshire; near Stoke Bridge (*Borrer* !). The representative of the Continental *obtusifolia* in this group.

Var. DECIPIENS (*Dumort.*).

R. TOMENTELLA, var. DECIPIENS, *Dumort. Belg.* p. 57.

Like *tomentella*, but the peduncle densely aciculate; the midrib beneath more glandular; the petiole both pubescent and glanduloso-setose, with several unequal aciculi; the sepals not fully reflexed, and densely glandulous on the back.

Northumberland, Wooller (*Baker*), and plants like ordinary *tomentella*, but with aciculate peduncles, gathered in Leicestershire by the Rev. A Bloxam, and in Cheshire by Mr. Wilson and the Hon. J. L. Warren.

Series 2. Subcristatæ. *Leaves not glandular beneath. Fruit softer when green, in the north of England ripening early in September; the sepals ascending after the petals fall, and not disarticulated till after it turns crimson. Disk narrower than in the last section, and styles more densely villose.*

This series of forms corresponds to the *Caninæ*, subsection 1, of Grenier's 'Flora of the Jura,' and to the *R. monticola* of the second edition of Rapin's 'Botanists' Guide to the Canton Vaud.'

Var. REUTERI (*Godet*).

R. REUTERI, *Godet, Fl. Jura*, p. 218; *Reut. Cat.* p. 68.

R. REUTERI *α*, *Gren. Jura*, p. 239; *Billot, Exsic.* 3581.

R. GLAUCA, "*Vill. inedit. sec. Lois. Not.* p. 80," *Rapin, Bull. Haller.* p. 180.

R. RUBRIFOLIA, var. PINNATIFIDA, *Seringe in DC. Prodr.* ii. p. 610.

R. CREPINIANA, *Déség. MSS., Baker, Review,* p. 28, *Exsic.* 21–22; *Dumort. Belg.* p. 62.

R. NUDA, *Woods, Linn. Trans.* xii. p. 205?

R. MONTICOLA *a, Rapin, Cant. Vaud,* edit. 2, p. 94.

Prickles more slender than in the plants of the last series; the habit, leaves, armature, and toothing like that of *lutetiana,* but the peduncles shorter and almost or quite hidden by the large clasping bracts, the flowers often deeper in colour, and sepals and fruit of the character just indicated. Leaves and calyx-tube glaucous. Bracts, stipules, and branches in exposure suffused with red. Fruit moderate or large-sized, ovate-oblong or subglobose. Sepals often (but not always) glandular on the back.

This appears to be widely diffused through the hilly tracts of the north of England. I am indebted to Dr. Rapin for a supply of Swiss specimens. Till lately the Swiss botanists always put it with *rubrifolia,* with which it closely corresponds in general aspect, but which has the sepals always simple and falling sooner, small round fruit, and longer peduncles.

Var. SUBCRISTATA, *Baker.*

R. SUBCRISTATA, *Baker, Review,* p. 29, *Exsic.* 23.

R. TOMENTOSA γ, *Woods, Linn. Trans.* xii. p. 197, *Herb.* 41.

R. CALEDONIÆ, *Borrer, MSS.*!

R. REUTERI, var. INTERMEDIA, *Gren. Jura,* p. 239.

R. COMPLICATA, *Gren. MSS. olim.*

R. STEPHANOCARPA, *Déség. et Ripart, MSS.*!

Bears just the same relation to *dumalis* that the last does to *lutetiana.* It is not unfrequent through the hilly tracts of the north of England; and Mr. Watson gathered it in Perthshire. A plant like this, but with deep-red flowers and aciculate peduncles, by the Swale-side, near Keld.

Var. HAILSTONI, *Baker.*

R. HAILSTONI, *Baker, Report Lond. Ex. Club,* 1867, p. 7.

Prickles moderately close and numerous, the large ones thickened and falcate, but passing down rather abruptly into numerous stout straight unequal aciculi. Leaves like those of the last form, but the fruit not ripening so early, and the sepals becoming sooner disarticulated, and styles not so densely villose.

North Yorkshire, near Sutton under Whitstoncliff (*Baker*): and a similar form, amongst Mr. Hailstone's Roses, without localization. In the irregularity of its prickles this approaches *hibernica,* and still more closely the *R. Schultzii,* Ripart, already referred to; but the large ones are of the *canina* type, and the general habit of the plant is just that of this group.

Var. IMPLEXA (*Gren.*).
R. IMPLEXA, *Gren. MSS. olim.*
R. SOLSTITIALIS, var. DENUDATA, *Gren. Jura,* p. 238.

Leaves and general habit of *urbica,* with the fruit of this series.

Seen only from the neighbourhood of Richmond in Yorkshire; gathered by Mr. Jas. Ward.

Var. CORIIFOLIA (*Fries*).
R. CORIIFOLIA, *Fries, Novit.* edit. 1, p. 33 (1814), *Herb. Norm.* vi. no. 43; *DC. Prodr.* ii p. 623; *Déségl. Mon.* p. 86, *Exsic.* 23; *Reut. Cat.* p. 69; *Baker, Review,* p. 30, *Exsic.* 24.
R. CRASSIFOLIA, *Walm. Liljebl. Sv. Fl.* iii. p. 268.
R. SEPIUM et SEPINCOLA, *Swartz, MSS.*
R. FRUTETORUM, *Besser, Hort. Crem. Suppl.* iii. p. 20.
R. BRACTESCENS, *Woods, Linn. Trans.* xii. p. 216, *Herb.* 90 & 91; *Smith, Eng. Fl.* ii. p. 391; *Borrer, Brit. Fl.* edit. 3, p. 242.
R. SOLSTITIALIS, *Gren. Jura,* p. 237, non *Besser*!
R. TEREBINTHINACEA, *Gren. in Billot, Exsic.* 1480; *non Besser*!
R. MONTICOLA δ, *Rapin, Vaud Guide,* 2nd edit. p. 195.

Combines the general habit of *dumetorum* with the fruit and sepals * of this series. Leaflets greyish-green, and thinly hairy above, paler and softly hairy beneath; the terminal one ovate-oblong, rounded at the base; the serrations simple, blunt, open; the petiole villose, but scarcely at all glanduloso-setose. Stipules and bracts hairy on the back, but little gland-ciliated. Peduncles short, hidden by the large clasping bracts. Styles densely villose. Fruit large and generally round.

In Britain, apparently rare and confined to the hilly tracts of the northern half of the island. I have seen it from Aberdeenshire (*Watson*!), Perthshire (*Hailstone*!), Berwickshire (*Johnstone*!), Northumberland (*Robertson*!), Lake, Lancashire (*Woods*!), and have gathered it myself in North Yorkshire. As long ago as 1814 Swartz identified the English with the Scandinavian plant. Dr. Moore has gathered in Derry a form with the peduncles aciculate, and Mr. Robertson the same in Upper Teesdale, on the Durham side of the river.

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* "Jam puer a ruricolis nostris hanc speciem distinguere didici et ultra viginti annorum quotidiana fere in natura observatione et cultura nisus a priori (*canina*) vere distinctam censeo. In agro Femsionensi, ob nisum suum species ad typum suum reducendi insigni, tres modo adsunt rosarum formæ; hæc *R. canina, opaca* et *R. mollissima,* easque ibidem conjungere plane impossibile est. Fruticis habitu, fructu globoso præcoci etc. ad *R. mollissimam* ibidem magis accedit quam ad *R. caninam.*"—FRIES, *Novit.* edit. 2, p. 148.

Var. WATSONI, *Baker*.

R. WATSONI, *Baker, Review*, p. 29.

R. BRACTESCENS β, *Woods, Linn. Trans.* xii. p. 216, *Herb.* 92.

R. CORIIFOLIA, var. BISERRATA, *Reut. Cat.* p. 69.

R. CINEREA, *Rapin, MSS. olim.*

R. MONTICOLA ε, *Rapin, Vaud Guide*, 2nd edit. p. 195.

R. SOLSTITIALIS, var. GLANDULOSA, *Gren. Jura*, p. 239.

Differs from *coriifolia* by its doubly toothed leaves, often not so hairy above; the secondary teeth gland-tipped; the stipules and bracts not so large, and densely gland-ciliated; the petiole glanduloso-setose as well as villose; stipules and bracts not so large, and nearly or quite glabrous on the back.

Inverness (*Watson*!), Perthshire (*Hailstone*!), Northumberland (*Robertson*!, *Baker*), Durham (*Robertson*!), Cumberland (*Westcombe*!), Westmoreland (*Woods*!), and a form with peduncles densely aciculate and glanduloso-setose and sepals densely glandulous on the back, gathered by Mr. Hailstone at the entrance of Glencoe from Loch Long.

Var. CELERATA, *Baker, Review*, p. 31.

Habit and leaves of *tomentella*, with the fruit and sepals of this section.

Seen only in Holywell dene, Northumberland.

Borrer's Glengoy plant, mentioned under *inodora* γ in the 'British Flora,' is a form like this, with the fruit turbinate and peduncles slightly setose.

Series 3. Subrubiginosæ. *Leaves glandular on the midrib, and slightly so on the principal veins, but not over the surface as in the true Rubiginosæ.*

Var. BORRERI (*Woods*).

R. BORRERI, *Woods, Linn. Trans.* xii. p. 210, *Herb.* 71–76; *Smith, Eng. Flora*, ii. p. 388; *Baker, Review*, p. 26.

R. DUMETORUM, *Eng. Bot.* t. 2579, non *Thuill.*

R. INODORA *a, Borrer, Brit. Flora,* 3rd edit. p. 235, *non Fries.*

Prickles robust and strongly hooked. Leaflets flat, the terminal one 15–18 lines long, broadly rounded or even cordate at the base, the serration copiously compound, the upper surface naked, the lower hairy on the ribs, and petiole never more than faintly, and sometimes very inconspicuously glandular on the main veins and petiole, the aciculi strongly hooked. Stipules and bracts naked, or very nearly so, on the back, densely gland-ciliated. Flowers often numerous in a cluster; the peduncle weakly aciculate; the calyx-tube ovate-urceolate, generally naked. Sepals copiously compound, naked on the back, reflexed or spreading after the petals fall, disarticulated by the time that it changes colour. Styles thinly hairy.

This is a plant which has been more misunderstood than any other British form, and which occupies just that intermediate position between ordinary *canina* and three or four of the others, that varieties of the former are liable to be assigned to it by those who have only book-descriptions to guide them. The true plant is clearly in its right place in the *canina* group, and is on the whole nearer to *tomentella* than to any other variety. I have seen it from Kent, Sussex, Surrey, Middlesex, Hertfordshire, Shropshire, Worcestershire, and Yorkshire. *R. inodora β* of the 'British Flora' I believe belongs to *tomentosa.* Hooker's plant in the 'Flora Londinensis' is apparently *tomentella.*

Var. BAKERI (*Déséglise*).

R. BAKERI, *Déséglise, MSS.*; *Syme, E.B.* 3rd edit. t. 473; *Baker, Review,* p. 34, *Exsic.* 30.

Prickles more slender and less hooked than in the last. Leaflets obovate, full green, copiously doubly serrated, the base cuneate, entire, the upper surface naked when mature, the lower thinly hairy, plainly glandular on the midrib and main veins; the petioles pubescent and finely glanduloso-setose, with a few very slender, slightly hooked aciculi. Stipules and bracts thinly hairy, and a little glandular on the back. Flowers never more than 3–4 in a cluster. Peduncles very short, naked or weakly aciculate. Fruit naked, oblong or turbinate, ripening early in September. Sepals not so compound as in the last, densely gland-ciliated, thinly glandular on the back, ascending after the petals fall, and not disarticulated till it has turned red. Styles villose.

North Yorkshire, hedges at Sowerby, near Thirsk.

The variety of *canina* that comes nearest to *pulverulenta*.

Var. MARGINATA (*Wallr.*).

R. MARGINATA, *Wallr. Ann. Bot.* p. 68; *Tratt. Mon.* ii. no. 144; *Roth, Enum.* i. p. 455; *Reut. Cat.* p. 66.

R. TRACHYPHYLLA, *Wirtg. Exsic.* 23, 23 bis, 233.

R. TRACHYPHYLLA, var. NUDA, *Gren. Jura,* p. 214.

R. BLONDEANA, *Ripart in Déség. Mon.* p. 93; *Baker, Review,* p. 34; *Déség. Exsic.* 52.

R. TRACHYPHYLLA, var. BLONDEANA, *Dumort. Belg.* p. 59.

R. TOMENTOSA, var. b, *Rapin, Vaud Guide,* edit. 2, p. 192.

Prickles considerably more slender and less hooked than in ordinary *canina*. Branches dark purple and glaucous in exposure. Leaves oblong, glaucous-green above, very pale beneath, and the veins unusually prominent; the serrations copiously compound, both sides quite without hairs, the lower ones plainly glandular on the principal veins; the petiole glanduloso-setose, but not at all pubescent, with 3 or 4 slender, slightly curved aciculi. Flowers not more than 3 or 4 together. Peduncles faintly aciculate. Fruit obovate or subglobose, ripening early in September. Sepals moderately compound, thinly glandular on the back, ascending after the petals fall, becoming disarticulated by the time it has turned red. Styles moderately hairy.

North Yorkshire, hedge at Kilvington, near Thirsk; and similar plants, but with the petiole slightly hairy, gathered in Derry by Dr. Moore, in the Isle of Arran by Prof. Babington, and in Caernarvonshire by Mr. Lees and Prof. Babington, some of them with the calyx-tube aciculate as well as the peduncle. I have not seen original specimens from Wallroth; but our plant quite agrees with what I have received from Dr. Rapin as his *marginata*. The prickles are scarcely more hooked or more robust than in ordinary *tomentosa*, with which it also agrees in its fruit and sepals.

Group 5. SYSTYLÆ.

12. R. STYLOSA, *Desv.* Frutex altus, ramis elongatis arcuatis, aculeis plerisque æqualibus falcatis deorsum valde incrassatis, foliolis simpliciter serratis supra glabris infra leviter pubescentibus eglandulosis,

floribus plerisque 3–6, pedunculis modice elongatis leviter aciculatis, sepalis reflexis deciduis dorso nudis vel tenuiter glandulosis, majoribus copiose pinnatis, fructibus late ovatis nudis serotinis disci valde incrassatis instructis, stylis laxe coalitis staminibus brevioribus.

Var. SYSTYLA (*Bast.*).

R. SYSTYLA, *Bast. Suppl. Fl. Maine-et-Loire* (1812), p. 31; *Woods, Linn. Trans.* xii. p. 230, *Herb.* 122–127; *Smith, Eng. Flora,* ii. p. 395; *Lindl. Mon.* p. 119; *Borrer, Brit. Flora,* edit. 3, p. 243; *Billot, Exsic.* 1663; *Déség. Mon.* p. 24, *Exsic.* 3.

R. COLLINA, *Eng. Bot.* t. 1895, non *Jacq.*

A bush 8 to 12 feet high, with elongated arching branches. Prickles uniform, scattered, the base deltoid, with shorter and less-hooked points than in *canina,* the main ones $\frac{3}{8}$ inch long and the scar as deep. Stipules naked, or nearly so, on the back, finely gland-ciliated. Leaves of the barren shoot $3\frac{1}{2}$–4 inches long, with 7 leaflets, the terminal one 15–18 lines long by two-thirds as broad, oblong, pointed, rounded at the base, the upper surface naked, the lower thinly hairy, principally on the ribs, not at all glandular; the serration quite simple, moderately acute; the petiole thinly hairy, not setose, with 2–3 slender uniform curved aciculi. Flowers generally 3–6 in a cluster; the peduncles often an inch or more long, thinly clothed with weak aciculi and setæ. Calyx-tube ovate-urceolate, naked or slightly setose at the very base. Sepals $\frac{1}{2}$–$\frac{5}{8}$ inch long, naked or a little glandular on the back, the main ones lengthened out at the point and copiously pinnate. Corolla pale pink or rarely white, 15–18 lines across when fully expanded. Fruit broad ovate-urceolate, or subglobose, $\frac{1}{2}$–$\frac{5}{8}$ inch long by $\frac{3}{8}$–$\frac{1}{2}$ inch broad, not ripening till October, the sepals falling before it changes colour. Column of styles glabrous, generally protruded 1–$1\frac{1}{2}$ line beyond the very prominent disk.

This is easy to recognize from *R. canina* in the typical form, but is quite connected with it by intermediate gradations. I have seen a form in which the column of the styles was protruded in the central flowers of a cluster, but not in the outer ones, and other specimens with the styles not at all protruded, for the rest quite doubtful between this and *collina.* Our ordinary English plant, as just described, is exactly the *systyla* of Déséglise; but *stylosa* and *leucochroa* are mere varieties of the same plant, and both names have a slight priority over *systyla.* I have seen this variety from Kent, Sussex, the Isle of Wight,

Middlesex, Hertfordshire, Gloucestershire, Somersetshire, and Devonshire. On the Continent I have seen specimens of the species only from France and Switzerland; but it is said also to inhabit Belgium and Styria.

Var. Desvauxii, *Baker*.

R. stylosa, *Desv. Journ. Bot.* (1810), p. 316; *Déség. Mon.* p. 26, *Herb. Ros.* 40; *Billot, Exsic.* 1483! *Gren. Jura*, p. 240; *Dumort. Belg.* p. 64.

Column of styles protruded as in the last, from which it only differs by its pure-white flowers, leaves thinly hairy all over beneath, and more hairy petioles.

A plant coinciding with the specimens in Déséglise's fasciculus gathered by Mr. Borrer at Hartwell, in Sussex.

Var. opaca, *Baker*.

Leaves dull grey-green above, and still more hairy beneath than in the last, quite three-quarters as broad as long, and rounded at the base. The peduncle shorter and quite naked, the flower pure white, and not much over an inch across, scarcely more than the head of stigmas protruded.

Kent, between Chilgrove and Brooms (*Rev. G. E. Smith!*).

Differs mainly from specimens of *R. fastigiata*, Bast. Suppl. Fl. Maine-et-Loire, p. 30, received from Déséglise, by its pure-white flowers.

Var. gallicoides, *Baker*.

General habit and leaves in shape like those of *systyla*, but the prickles of the branches copiously intermixed with aciculi and glandular setæ; the leaves only very faintly hairy beneath and on the petiole, but the latter copiously glanduloso-setose, and a few glands extending to the midrib; the central serratures with one or two accessory gland-tipped teeth. The peduncles densely clothed with fine subequal glandular setæ, which extend more or less to the calyx-tube, sometimes covering it all over, the latter narrower and longer than in the type. The sepals glandular on the back, and densely gland-ciliated; the column of styles equalling the stamens; the corolla pure white; the fruit obovoid, naked, $\frac{5}{8}$ inch long by $\frac{3}{8}$ inch broad.

Warwickshire, Chesterton Wood, near Myton (*H. Bromwich!*). A very remarkable variety; and I have nothing from the Continent resembling it. In armature it recalls the *Gallicanæ*, only that it is more densely aciculate and setigerous than any of the plants of that section I have seen.

Var. MONSONIÆ, *Lindl. Mon.* p. 112; *Smith, Eng. Fl.* ii. p. 396.

R. COLLINA MONSONIANA, *Redouté,* 4to edit. t. 58.

A low erect bush with short ascending branches, with a few glandular setæ and aciculi mixed amongst the prickles. Leaflets in shape and serration just like those of the type, greyish-green, naked above, thinly hairy beneath. Peduncles and sepals of the type, but the petals of a "beautiful glowing red" and larger than in any British Rose; only the head of the stigmas protruded beyond the disk; the styles thinly hairy; the fruit roundish and orange-red, like that of *gallica* in size and shape.

A single bush found by Miss Monro in a hedge near Watford in Hertfordshire, and transferred to the garden of Lady Monson, from which it was spread in cultivation. Mr. Borrer suggests that it is a hybrid with one of the *Gallicanæ.*

13. R. ARVENSIS, *Huds.* Frutex humilis, ramis flagelliformibus elongatis, aculeis æqualibus falcatis deorsum valde incrassatis, foliolis simpliciter serratis utrinque omnino nudis infra glaucescentibus, floribus plerisque 1–6, pedunculis elongatis glandulosis, sepalis latis brevibus deciduis dorso nudis majoribus paullulum pinnatis, fructibus globosis vel late ovoideis parvis nudis serotinis discis valde incrassatis instructis, stylis coalitis stamina æquantibus.

R. ARVENSIS, *Huds. Fl. Angl.* edit. 1, p. 192 (1762); *Linn. Mant.* ii. p. 245; *Smith, Eng. Flora,* ii. p. 397; *Woods, Linn. Trans.* xii. p. 232. *Herb.* 128–132; *Déség. Mon.* p. 21; *Dumort. Belg.* p. 64; *Gren. Jura,* p. 239; *Reut. Cat.* p. 73.

R. SYLVESTRIS ALTERA MINOR, FLORE ALBO, NOSTRAS, *Ray,* edit. 2, p. 220 (1689); *Buddle, Herb.* !

R. REPENS, *Scop. Fl. Carn.* i. p. 355; *Gmel. Bad.* ii. p. 418; *Reich. Exsic.* 1752; *Déség. Mon.* p. 22, *Exsic.* 2.

Bush not more than 2 or 3 feet high when not supported, with long trailing shoots, which are purple and glaucous in exposure. Prickles scattered, uniform, strongly hooked, the lower part subdeltoid, about 4 lines long, and the scar quite as deep. Stipules naked and only faintly gland-ciliated. Leaves of the barren shoot $2\frac{1}{2}$–3 inches long, with 7 leaflets, the terminal one broad-oblong or broad-obovate, 9–12 lines long by three-quarters as broad; the base broadly rounded; the serratures quite simple, blunter, and not so deep as those of ordinary *canina*; both sides quite naked, the upper deep green, the lower subglaucous; the petiole not at all or only very faintly hairy and setose, with 3–4 slender uncinate aciculi. Flowers 4–6 if the branch is at all robust; the peduncles often an inch or more long, close together, purple in exposure, more or less densely clothed with nearly or quite sessile glands. Calyx-tube turbinate, purple and glaucous, usually naked, rarely a little glandular. Corolla 15–18 lines across when expanded, pure white, with a yellow throat. Sepals naked on the back, broad-bladed, not more than ½ an inch long, hardly at all leaf-pointed, and the main ones with only 1–2 pairs of minute setaceous pinnæ low down, reflexed after the petals fall, deciduous. Fruit subglobose, naked, measuring about half an inch long and thick, not turning red till October, with a thick prominent disk. Styles always firmly united in a glabrous column which equals the stamens.

This is much more common in the southern than the northern half of England; and though it reaches Kincardineshire, it is a very rare plant north of the Tweed. On the Continent it does not reach northward to Scandinavia; but from Belgium and France it is common eastward through Central Europe, extending to Sicily, Macedonia, and the Ural Mountains. Our ordinary plant is the *repens* of Déséglise; his *arvensis* is a weak form, with the peduncle naked and flowers usually solitary.

Var. BIBRACTEATA (*Bastard*).

R. BIBRACTEATA, *Bast. in DC. Fl. Franç.* v. p. 537; *Tratt. Mon.* ii. p. 96; *Déség. Mon.* p. 18.

R. ARVENSIS, var. BIBRACTEATA, *Seringe in DC. Prodr.* ii. p. 597; *Dumort. Belg.* p. 65.

R. RUSTICANA, *Déség. Billotia,* p. 34, *Herb. Ros.* 1.

Shoots stronger and more assurgent than in the type; leaflets 15–18 lines long by two-thirds as broad, more pointed than in the type, and more sharply toothed; the calyx-tube and fruit obovoid; the sepals a little more compound; the peduncles rather more spreading than in the type, thinly glandular; the petals often an inch deep; the fruit ⅝–¾ inch long by ½ inch broad.

Seen from Sussex (*Borrer*!, *Woods*!), Devonshire (*Briggs*!), Cambridgeshire (*Babington*!), Essex (*Varenne*!), and Northumberland (*Richardson*!). Liable to be called *systyla* by those who know ordinary *arvensis* and not the other species.

From the preceding list *rubella* and *pomifera* require to be deducted as doubtful natives. In addition a few other species have been gathered as strays from garden cultivation. *R. cinnamomea*, L., found by Mr. Sabine long ago near Pontefract, is frequent in gardens, and widely dispersed as a native plant in continental Europe. *R. lucida*, Ehrh., found by Mr. Borrer near Keswick (Phyt. ii. p. 437), and by Mr. Reeves near Tunbridge Wells, is a common North-American rose, also frequent in gardens. The same plant has been gathered in a subspontaneous state in France and Germany, and is *R. baltica*, Roth (Enum. ii. p. 464; Koch, Syn. p. 414). The subspontaneous Yorkshire and Sussex Roses, mentioned by Mr. Borrer in the 'British Flora,' 3rd edit. p. 245, do not appear to be essentially different from *R. provincialis*, Ait.; and the *R. arvensis*, var. *Andersoni*, mentioned by Smith, 'Eng. Flora,' ii. p. 398, I believe to be *R. austriaca*, Crantz. The two latter are both members of the *Gallicanæ* group.

Notes on the Stictei in the Kew Museum.

By CHARLES KNIGHT, Esq., F.L.S.

[Read April 15, 1869.]

DR. NYLANDER arranges the Stictei under three genera—*Stictina*, *Sticta*, *Ricasolia*. An examination of these lichens in the Kew collections shows that this distinguished lichenologist, in his 'Synopsis Methodica Lichenum,' has not in every case arranged the species in accordance with his own scheme of classification.

The essential distinctive characters which separate *Stictina* from *Sticta* depend on differences in the colour and structure of the gonidial cells. In the genus *Sticta* the gonidial layer consists of free cells and hyaline filaments; and each cell contains bright green protoplasm. In *Stictina*, on the other hand, we find in the gonidial layer irregular-shaped cellular "nodules," in the cells of which are imbedded two or more bluish granules (granula gonima).

Stictina faveolata (Nyl. Syn. p. 337).

The numerous specimens in the Kew Collections, whether named by Babington or Nylander, belong to the genus *Sticta*, with the exception of Lechler's plant no. 598 *c*. "*Sticta cervicornis β. atrovirens*, Flot.," and another from the Paris Museum ticketed "*Sticta faveolata*:" these two plants being identical, it would be convenient to retain the name *Stictina cervicornis*; the others will be referred to the genus *Sticta* under the name of *Sticta faveolata.*

Stictina carpoloma (Nyl. Syn. p. 339).

The lichens arranged under this name in the Kew collections must be referred to the genus *Sticta,* with the exception of two specimens—one (*Stictina gilva*) collected by Lyall in the Falkland Islands, and the other (also *Stictina gilva*) collected by Dr. Mueller in Victoria (no. 154). As far as one can determine from the Kew collections, which are extremely rich in specimens, *S. gilva* has been mistaken for *S. carpoloma.*

Dr. Nylander, in his 'Synopsis,' quotes as synonyms of *S. carpoloma,* Dél., the *S. Desfontainii,* Dél, and *S. gyrosa,* Flot. (Lechler's Pl. Macleov. no. 66). The specimens of *S. Desfontanii* in the Kew Museum (no. 562, Lechl. Pl. Chilenses) are widely different from *S. carpoloma*; and those of *S. gyrosa* from the Falkland Islands bear no resemblance whatever to it.

Stictina granulata (Nyl. Syn. p. 340).

These, Dr. Nylander has since found, belong to the genus *Sticta.*

Sticta retigera (Nyl. Syn. p. 351).

Belongs to the genus *Stictina.* There are numerous specimens in the Kew Museum, chiefly arranged under *Sticta pulmonacea.*

Sticta linita (Nyl. Syn. p. 353).

Several specimens arranged under this name in the Kew Museum belong to *Stictina.* They differ from *Stictina retigera* and *S. scrobiculata* in having white powdery pseudocyphellæ, and from *Sticta pulmonacea* and *S. linita* in having the gonidial layer made up of bluish "granula gonima" instead of true gonidia. I have named them *Stictina reticulata.*

Sticta scrobiculata (Nyl. Syn. p. 353).

Dr. Nylander has lately correctly referred it to *Stictina.*

Sticta damæcornis, var *macrophylla,* Dél. (Nyl. Syn. p. 356).

The plants collected in the Mauritius by Dr. Ayres, and the specimen from Mus. Hist. Nat. Paris, belong to *Stictina.* *Sticta macrophylla,* Schær., will stand as a variety of *S. damæcornis.*

Sticta obvoluta (Nyl. Syn. p. 362).

Belongs to the genus *Stictina.*

There seems to be some confusion in reference to the synonyms in Nylander's 'Synopsis,' under *S. gyalocarpa* and *S. Kunthii* (p. 342). I suspect it will be found that *S. cyathicarpa*, Dél., belongs to *S. gyalocarpa*, Nyl.

Sticta Guillemini (Nyl. Syn. p. 362).

Is also a *Stictina*. There is, however, a pretty, fawn-coloured, delicate lichen, referred by Babington to *S. Guillemini*, Mont. It is a true *Sticta*, with large gonidia, the thallus above covered with soft white hairs, pseudocyphellæ citron-colour, apothecia pedicellated, scattered, and the thalline receptacle hairy.

Sticta punctulata (Nyl. Syn. p. 364).

The specimen collected by Dr. Maxwell in Ceylon and named by Dr. Nylander is a *Stictina*. There is another specimen, however, also collected in Ceylon, but a much more robust plant, referable to the genus *Sticta*.

Sticta endochrysea (Nyl. Syn. p. 358).

This plant and the synonyms are correctly placed in Dr. Nylander's work. In all the specimens in the Kew Museum the thallus is covered with a most minute tomentum, as well as the thalline receptacle of the apothecia. But there is another species, curiously like the *S. endochrysea*, belonging to the genus *Stictina*, with the inner layer of the thallus yellow, the thallus most minutely tuberculated, and the spores acicular. The plants belonging to the latter are Lechler's pl. 562, "*Sticta Desfontainii*," and Gay's plant "*S. d'Urvillei*, Dél. (*S. orygmæa*, Mont.)," from the Paris Museum.

The following notes on the nomenclature of *Stictei* in the Kew Museum may be useful.

Stictina ciliaris, *Mont.* Idem valet *S. tomentosa*, Lechl. Pl. Chil. 3124 bis.

Stictina fragillima, *Bab.* Idem valent :—*S. variabilis*, Ach. (Nyl.), nos. 135 & 152, Coll. Mueller, Victoria; *S. filicina*, Ach. (Bab.), nos. 170, 171, 173, & 196, Coll. Oldfield, Tasmania.

Ricasolia Schæreri, *Mont.* Idem valet *S. sinuosa*, Pers. (Nyl.), no. 2176, Coll. Cuming, Philip. Is.

Stictina reticulata, n. sp. Idem valet *S. pulmonacea*, Dr. Lyall, Oregon.

Stictina retigera, *Ach.* Idem valet *S. pulmonacea*, Herb. Ind. Or. Hook. fil. et Thom. nos. 1964, 1968, 1969–1975, 1977–1983.

Sticta Urvillei, v. flavicans, *Hook.* Idem valet *S. Desfontanii*, Dél., W. Lechl. Pl. Chil. no. 562 *a*, Valdivia.

Stictina marginifera, *Mont.* Idem valent *S. Kunthii*, Dél. (Flot.), W.

Lechl. Pl. Chil. no. 647, et *S. sylvatica,* Herb. Ind. Or. Hook. fil. et Thom. no. 2004.

Sticta episticta, *Nyl.* Idem valet *S. argyracea,* Dél. (Bab.) Pl. N. Z. [*S. argyracea* has not been found in New Zealand.]

Stictina obvoluta, *Ach.* Idem valent *S. Guillemini,* Mont. (Nyl.), W. Lechler's pl. no. 852, et *S. hirsuta,* W. Lechler's pl. no. 357.

Ricasolia corrosa, *Ach.* Idem valet *R. Kunthii,* Dél. (Nyl.), Mus. Nat. Hist. de Paris.

Ricasolia subdissecta, *Nyl.* Idem valet *R. Kunthii,* Dél. (Nyl.), Coll. Galeotti, no. 6895. Mexico.

Sticta carpoloma. Idem valent *S. physiospora,* Nyl., et *S. glauco-luridæ,* Nyl.

Synonymia Muscorum Herbarii Linnæani apud Societatem Linnæanam Londinensem asservati. Exposuit W. Ph. Schimper, S.L.L.S.

[Read April 15, 1869.]

Fasc. I.

Sphagnum palustre, *L.*=Sph. acutifolium, *Eh.*

Sphagnum=Leucobryum glaucum ex India.

Sphagnum=Leucobryum glaucum, var. minus, *Hpe.*

Buxbaumia aphylla, et B. sessilis, *Schmd.* Specimina numerosa adsunt.

Phascum acaule=Phascum cuspidatum, *Schr.*, forma humilis.

Phascum subulatum=Pleuridium subulatum, *Bruch et Schimp.*

Phascum pedunculatum, "minime, nec Phascum. *Habit.* Anglia."=Pleuridium axillare.

Phascum serratum. *Habit.* Angl.=Ephemerum serratum.

Gymnostomum prorepens, ex Amer. Sept. (Hypnum clavellatum, *Dill.*), ex manu *Smith,*=Drummondia clavellata.

Phascum, sp. n., Jamaica,=Filotrichella. (Leskeæ flexili, *Hook.*, similis.)

Fontinalis antipyretica; forma genuina.

Fontinalis Jacquini, *L.*=F. antipyretica, forma laxior, viridis.

Fontinalis minor, *L.*, Upsal,=Font. antipyretica, forma minor.

Fontinalis squamosa, *L.*=F. Dalecarlica, *Sch.*

Fontinalis alpina, *Dicks.* Scotia, *Smith* scripsit!=Cinclidotus fontinaloides.

Fontinalis pennata, *E.*=Neckera pennata.

Fontinalis disticha, *L.*=Neckera disticha, sec. *Smith.*

102. id. qui 89.=Amblystegium riparium, *Sch.*

Fontinalis. *Hab.* Jamaica.=Pterobryum angustifolium, *C. M.* ?

Fasc. II.

Splachnum rubrum, *L.*

Splachnum luteum, *L.*

I. Splachnum gracile, II. III. IV.=Spl. luteum.

Splachnum umbraculo ampullaceo globoso minimo, in paludibus cæspitosis juxta Tockmock Lapponiæ Lulensis, = Spl. gracile, seta longissima.

Splachnum ex America Septentr. = Spl. gracile.

Splachnum ampullaceum, specim. numerosa.

Splachnum vasculosum.

Phascum caulescens, lectum in Lapponia, cit. *Dillen.* 550, *T.* 85, 15. *Smith* adnotavit " vix *Dillen.*"

Specimina ad dextram et ad sinistram posita ad Splachnum angustatum pertinent, medium ad Cynodontium Bruntoni.

No. 38, Zoega. Splachnum bryoides, *Zoeg. Fl. Island.* = Tetraplodon mnioides.

Phascum pedunculatum, "*Dill. Musc.* 344. t. iv.; *Huds. Angl.* 391." Lectum in Lapponiæ plpibus, *O. S.* = Tetrapl. mnioides manu *Smithii* adscript.; Splachnum fastigiatum, *Sw.*, *Dicks.*

Splachnum . . . . . North America, sec. *Smith.* Splach. caulescens, *Dicks.* = Tetraplodon angustatus, forma gracilescens.

Folio singulo specimina Splachn. gracilis, lutei, rubri, vasculati, angustati, mnioidis adfixa sunt.

No. 9. Polytrichum magellanicum, e fretu Magellan. = Pogonatum magellanicum.

Polytrichum commune; in eadem pagina et sub nomine eodem Pol. gracile, *Menz.*

Polytrichum commune, in folio secundo, a *Smithio* P. juniperinum nominatum, ad Pol. formosum pertinet.

Polytrichum urnigerum = Pogonatum urnigerum.

Mnium polytrichoides (*Ehrh.*) = Pogonatum subrotundum.

Polytrichum hercynicum, e Scotia, *Dicks.* = Oligotrichum hercynicum.

11. Polytrichum convolutum, *L.*, ex insula Bourbon. Verum!

Polytrichum strictum, e Grœnlandia.

Fasc. III.

Mnium pellucidum = Tetraphis pellucida.

4. Mnium androgynum = Aulacomnion androgynum.

Mnium fontanum = Philonotis fontana, *Br.*

3. Mnium palustre = Phil. fontana, forma gracilis.

3. Mnium palustre = Aulacomnion palustre.

2. sine nomine; mixtum e Philon. fontana foliis subfalcatis et e plantis mascul. Weberæ albicantis compositum.

Mnium hygrometricum = Funaria hygrometrica.

Mnium purpureum = Ceratodon purpureus.

In folio 2. specimina 2 Amblystegii serpentis immixta sunt.

Bryum 7. setaceum = Trematodon ambiguus.

Bryum annotinum, specimen primum = Ceratodon purpureus, alterum = Bryum cernuum.

Mnium hornum.

Bryum capillare.

In fol. 2. Br. capillare (?), specimen primum = Br. atropurpureum, secundum = Bryum capillare ♂.

Mnium crudum = Webera cruda, forma minor ut in Sueciæ et Norvegiæ alpibus provenit.

Mnium pyriforme = Webera pyriformis.

13. Bryum serpyllifolium = Mnium cuspidatum.

In fol. 2. Jungermannia (Plagioch.) asplenioides cum plantis sterilibus Bryi rosei.

In fol. 3. Mnium cuspidatum.

Fol. 4. Br. serpyllifolium = Mn. cuspidatum; in medio surculorum sterilium planta sterilis Bryi rosei conspicitur.

12. (ex Amer. Sept.) = Bryum roseum ♂.

15. Bryum triquetrum = Meesia tristicha.

Mnium trichomanes = Jungermannia trichomanes.

Fasc. IV.

Bryum apocarpum: specimen majus, superius = Hedwigia ciliata; minus, inferius = Grimmia apocarpa, var. alpicola.

Folium 2. Grimmia apocarpa; in medio specimina duo sterilia Racomitrii fascicularis.

Folium 3. Grimmia apocarpa.

Bryum striatum: specim. superius = Orthotrichum speciosum; specimina 3 media = Orth. Sturmii; specim. ultimum = Orth. cupulatum; specim. primum inferius = Orth. anomalum; secundum = Orth. affine cum Orth. specioso; tertium = Orth. Sturmii.

Weissia ulophyllum nostr., Bryum striatum, *L.*, δ, Hannoveræ, 1776, = Ulota crispa.

Fol. 3. in schedula "Weissia ithyphyllum nostr., Bryum striatum α, β, *Linn.*, Hannoveræ, 1779," "Orthotrichum affine, *Schrad.* certe," *Smith,* = Orth. affine.

3. (Bryum) pomiforme = Bartramia Œderi.

Folium 2. pomiforme = Bartramia ithyphylla.

Fol. 3. sine nomine = Bartr. pomiformis.

Fol. 4. pomiforme "cum calyptra" = Cynodontium polycarpum.

Fol. 5. Bryum montanum, *Smith* scripsit, = Bartramia pomiformis, var. crispa, elata, pedicello breviore.

Fol. 6. (Bryum) pomiforme, *L.* = Bartramia ithyphylla.

Fol. 7. sine nomine = Bartr. pomiformis, var. crispa.

Fol. 8. sine nomine = Bartramia Halleriana, sterilis.

1. Bryum pyriforme, *Smith* scripsit, = Webera pyriformis.

2. Idem.

Bryum extinctorium = Eucalypta vulgaris.

Bryum subulatum = Barbula subulata.

7. Bryum rurale = Barbula ruralis; specimina numerosissima!

1. (Bryum) scoparium = Dicranum scoparium.
2. Idem.
3. heteromallum (?) = Dicr. scoparium.

Bryum undulatum, folia 2 impleta, = Atrichum undulatum.

Bryum glaucum, folia 2, = Leucobryum glaucum.

Bryum albidum = Octoblepharum albidum.

Bryum unguiculatum, " Dicranum tenue est, at non differt a Dicrano purpureo," *Smith* ! = Ceratodon purpureus, caule longiore, fructu vix supra ramos elato.

Bryum aciculare = Rhacomitrium aciculare.

Folium sine nomine = Dicranella heteromalla.

Bryum heteromallum = Distichium capillaceum.

Fasc. V.

1265 (2). Bryum 18. truncatulum = Pottia truncata.

Fol. 2. sine nomine Linnæan., 9. fasciculare, et Bryum Ægypti, ab *Hasselquist*, = Entosthodon niloticus.

Fol. 3. Bryum Ægypti, *Smith*, = Entosthodon fascicularis et ex parte forsan ! Entosth. niloticus.

(Bryum) truncatulum, *Smith* adscripsit G. Heimii, = Pottia truncata var. major.

Folium sine nomine = Physcomitrium (Entosthodon) fasciculare.

19. (Bryum) viridulum = Fissidens viridulus.

Fol. 2. sine nomine, manu *Smithii* Br. viridulum, = Fissidens exilis (*Bloxami*).

Fol. 3. sine nomine = Fissidens incurvus (?), capsula suberecta, operculo magno crassirostro !

Fol. 4. B. viridulum = Pottia truncata, Dicranella varia.

Fol. 5. B. viridulum = Pottia truncata (eustoma).

Bryum murale. Specimen primum supra = Grimmia trichophylla (*Muhlenbeckii* !) ; spec. secundum = Grimmia pulvinata ; spec. tertium = Grimmia commutatata, *Hüb.* ; spec. quart. et quint. = Rhacomitrium heterostichum ; spec. inferius magnum = Grimmia *Muhlenbeckii* (Trichophylla *auctor. Suec.*).

(Bryum) paludosum (nomine stylo cerussato adscriptum !) = Gymnostomum (Hymenost.) microstomum.

21. (Bryum) hypnoides = Rhacomitrium lanuginosum ; fol. secundum = Rhacom. microcarpum ; fol. tert. = Rhacom. lanuginosum.

Bryum Celsii, " compared ad Oxford, *Dicks.*" = Ceratodon purpureus.

Bryum Celsii, stylo cerussato adscriptum ; Musca uliginosa, *Hedw. Schwgr. Herb. Dill.* 28 ? trichodes, *Smith* adscr. = Amblyodon dealbatus.

Bryum squarrosum = Paludella squarrosa.

Br. argenteum, fol. 2. et 3.

Bryum pulvinatum, *Ehrhardt* scripsit ? = Grimmia trichophylla *auctorum Suec. nec Greville* ; fol. 2. idem.

(Bryum) setaceum? *Jacq.*, " D. pellucidum, *Wilk.*?" *Smith* adnotavit,= Webera elongata.

28. Bryum cæspiticium = Br. pallescens.

Folium 2. sine nomine speciem eandem continet.

Fol. 3. sine nomine = Bryum bimum? foliis strictissimis, imbricatis, costa ad apicem producta.

Fol. 4. sine nomine = Bryum cæspiticium.

Fol. 5. Bryum cæspiticium = Webera nutans.

Fol. 6. Br. cæspiticium = Webera nutans.

Mnium carneum = Webera carnea.

" Simplex (nequaquam est Br.)" stylo ceruss. scriptum = Dicranella heteromalla.

Bryum dendroides exoticum! = Sterobryum.

Bryum alpinum, *L.*, recte! foliis obtusis subcochleariformibus.

1265 (3). Bryum—" an nova spec.?" = Dicranum undulatum.

Bryum luteum, N. America, = Desmatodon latifolius (glacialis) capsula angustiore cylindrica.

Bryum virens = Dicranum virens.

Mnium capillaceum, a *Linnæo* ad Bryum acaulon heteromallum, setis longis pallidis, *Dill.Musc.* 49. f. 57, allatum! = Distichium capillaceum.

Bryum mucronatum, Nova Zeelandia, = Brachymenium.

Bryum . . . " vix differt a Dicr. purp." *Smith,* = Ceratodon purpureus.

Fol. sine nomine, in reverso " No. 1. D. tortuosum," = Weisia crispula.

Fol. sine nomine, in reverso " Br. vel Mnium quale?" = Bryum capillare.

Dicranum cerviculatum = Cynodontium polycarpum (strumiferum).

Fol. 2. id.

Bryum alpinum? *Smith* scripsit, = Bryum coronatum.

Meesia dealbata? *Smith* scripsit, = Funaria hygrometrica, v. calvescens.

1266 (1). Hypnum.

Hypnum spiniforme, Jamaica, = Rhizogonium spiniforme.

Hypnum 2. taxifolium = Fissidens taxifolius.

Hypnum 7. complanatum = Hypn. (Plagiothec.) sylvaticum.

7. fol. 2. = Neckera pennata.

(Hypn.) denticulatum = Hyp. (Plagioth.) denticulatum.

6. adiantoides = Fissidens adiantoides.

Hypnum complanatum, *Ehrhard* scripsit? = Neckera complanata.

Hypnum lucens (*Ehrhard?*) = Pterygophyllum lucens.

Hypnum undulatum = Hypn. (Plagioth.) undulatum.

Hypnum lucens = Phyllogonium fulgens, *Sw.*

Hypnum undulatum = Phyllogon. fulgens.

Hypnum "nova" id., ex Jamaica.

10. undulatum = Neckera crispa.

crispum = Neckera crispa.

triquetrum? = Hypnum (Hylocomium) triquetrum; fol. 2. triquetrum = id.

rutabulum = Meteorii spec. ex Jamaica?

(Hyp.) rusciforme, *Hall.* = Hypnum (Eurhynch.) striatum.

H. rusciforme, var. rutabuli, = Isothecium curvatum.

Hypnum rutabulum, exotic., = Leptohymenii spec.

Hypnum crassum, *nob.* "an gracilis varietas maj.? Hypnum 1745, Haller ed. 2, indeterminatum ex Helvetia habui." = Isothecium curvatum, var. incrassatum.

Hypnum proliferum = Hyp. (Hylocomium) splendens.

delicatulum (?) stylo ceruss. scriptum manu (?) = Thuidium delicatulum.

prælongum (?) = Hypn. (Amblysteg.) riparium.

19. crista = Hypnum crista-castrensis.

Hypnum crista, N. Amer., id.

crista-castr. = Hyp. molluscum; specimen fertile ad H. uncinatum, var. plumulatum, pertinet.

crista-castrensis, recte!

20. (Hypn.) abietinum, recte!

Hypnum terrestre, erectis ramulis teretibus, foliis inter rotunda et acuta medio modo se habentibus, R. S. 81 = Thuidium Blandovii.

Fol. 3 & 4. Thuidium abietinum.

19. Hyp. aduncum = Hyp. uncinatum.

Fol. 2. sine nomine = H. uncinatum.

Fol. 3. aduncum = H. uncinatum.

Fol. 4 & 5. sine nomine. Specimen fructiferum stylo ceruss. inscriptum H. uncinatum = Hypnum exannulatum; specim. sterile fol. 5. aduncum (?) signatum = H. exannulatum.

1266 (2). Hypnum.

23. scorpioides, recte!

Hypnum reticulatum = Anomodon viticulosus.

17. parietinum = Hyp. Schreberi, cum Thuid. Blandovii, specimen fructiferum ad Aulacomnion palustre pertinet.

Hypnum aquaticum = Cinclidotus aquaticus.

squarrosum, stylo ceruss. inscript. = Hyp. (Hylocom.) squarrosum.

Hypnum dendroides = Climacium dendroides.

29. curtipendulum = Antitrichia curtipendula.

Hyp. . . . filifolium = forma tenuis Hyp. (Eurhynch.) prælongi.

Hypnum illecebrum, *Flor. Lapp.* 403 = Aulacomnion turgidum, forma humilis incrassata.

riparium, *Smith* scripsit? recte!

Hypnum 33. cuspidatum = Hyp. giganteum, *Sch.*

Fol. 2. sine nomine, Hyp. cuspidatum.

sericeum = Hyp. (Amblyst.) serpens.

37. velutinum = Pterigynandrum filiforme.

serpens differt ab H. serpente nostro genuino, capsula breviore, crassiore, foliis tenuibus latioribus longe cuspidatis; proxime ad Hypn. saxatile, *Sch.*, vel ad H. hygrophilum, *Jurat*, accedit.

Hypnum sciuroides = Leucodon sciuroides.

H. gracile = Pterogonium gracile.

Hypn. myosuroides, sterile, = Isothecium curvatum.

Fol. 2. H. myosuroides, pars major speciminum, cum fructibus 2, ad Isoth. myurum (curvatum) pertinet, altera pars, cum fruct. 3, ad Hyp. (Eurhynch.) myosuroides.

(Hypnum) clavatum = Pylaisia polyantha.

Hypnum Halleri, recte!

Bayum 33. nitens = Hypnum giganteum.

fluitans, nomen manu *Linn.* obliteratum! = Hypnum fluitans.

fluitans, *Fl. Suec.* = Lepidopilum polytrichoides.

Fol. 2. sine nomine, id.

1266 (3). Hypnum.

Hyp. serpens = Hypn. (Eurhynch.) strigosum v. præcox, forma quæ in collibus siccis prope Upsaliam reperitur!

Fol. 2. id.

Hypnum, Yorkshire, a *Smith* H. pennatum inscriptum, = Neckera pumila.

11. Hypn. cupressiforme.

H. filicinum = Hyp. cupressiforme.

Hypnum cernuum, *nobis*, "an myosuroidis var.? ex Helvetia indeterminatum habui *Dill.* t. 61. f. 52," = Hypnum (Rhynchost.) murale.

Hypnum reflexum = Hypnum protensum.

Hypnum aristatum, *Dill.* 41. f. 52 = Hyp. (Rhynchost.) murale.

Hypnum trichodes, *Hall. Hist.* 1751, = Hyp. (Plagioth.) silesiacum.

Hypnum rubiginosum, *Hall. Hist.* 1753, *Dill.* p. 60. (In thallode rubiginoso Jungermanniæ pallescentis insidens!) Brachythecium salebrosum esse videtur.

Hypnum purum, "anne purum et abietinum idem differentia quadrat," = Hyp. Schreberi.

Hypnum pilosum, *Hall. Hist.* 1778, = Dicranum virens.

Hypnum trichomanoides = Homalia trichomanoides.

35. velutinum = Hyp. (Brachyth.) salebrosum.

25. velutinum = Hypnum Halleri.

12. Hyp. sciuroides = Isothecium curvatum.

23. Hyp. sericeum = surculus prorepens Hyp. (Brach.) plumosi.

9. Hyp. serpens = Hypnum fastigiatum.

24. Bryum tortuosum = Barbula tortuosa.

16. Hypnum crispum, Hypn. (Amblyst.) radicale esse videtur.

8. Hypnum denticulatum = Hypn. (Rhynch.) rotundifolium.

Sine nomine = Hypn. (Brachyth.) rutabulum.

Bryum . . . = Hypn. (Brachyth.) velutinum (intricatum).

Hypnum = Leskea polycarpa, var. paludosa.

Specimen Eustichii norvegici, probabiliter ex Islandia proveniens sub No. 40. prostat.

Hypna exotica nonnullique alii musci pleurocarpi sine nomine et loci indicatione adsunt.

Notes on some Brazilian Plants from the neighbourhood of Campinas. By JOAQUIM CORREA DE MELLO. (Translated and communicated by G. BENTHAM, Esq.)

[Read November 4, 1869.]

Campinas, January 28, 1869.

It is now some time since I received your letter of the 8th of December 1867, which I delayed replying to because I wished first to make some experiments and observations. It shall be my care to do all in my power towards satisfying your desires. I have commenced making collections of plants of the different Orders mentioned in your letter; but these collections are as yet, for the most part, incomplete, my attention having been hitherto directed in preference to the Order of Bignoniaceæ.

The Order of Leguminosæ is here a most extensive one, represented by very many genera and innumerable species, from small herbs to the tallest trees to be met with in the woods and campos more or less in proximity to this town. I have commenced a collection of them for you; but as yet it is only complete for a few species. Amongst the complete ones, some appear to me to be interesting, such as:—a *Schizolobium*, Vog. (*Cassia parahyba*, Vell. Fl. Flum. 168. ic. iv. t. 71); a *Dimorphandra*, Schott (*Cassia fluminensis*, Vell. *l. c.* 168. ic. iv. t. 72), the pods of which are erect, not pendulous, as represented in the plate quoted (I think that the fact of their being thus represented was owing to a liberty taken by the artist in order to get the fruit within his plate); an *Enterolobium* (*Mimosa contortisiliqua*, Vell. *l. c.* ic. xi. t. 25); of the *Andira humilis*, Mart., which is almost stemless, and is very common in the neighbourhood of this town and of that of Mogi-mirin, I have some fruits preserved in spirit, &c.

Of the genus *Arachis* I have the *A. hypogea*, Linn., which is cultivated here on a small scale for its seeds, which are eaten raw or roasted, or for the oil, which is used for burning. In order to observe whether this plant might not produce aerial as well as subterranean pods, I last year sowed some seeds of it, as well as of the *Voandzeia subterranea*, Thou., imported here from the African coast, which is cultivated in some fazendas here by the negroes for the seeds, which are eaten boiled; and I contrived to prevent the ovaries of both from penetrating into the ground, either by the interposition of a resisting body (a dry leaf or a slip of wood), or by raising the branch of *A. hypogea* (when the flower was not produced too low down) so that the ovary could no longer reach the ground. Under these circumstances, in the *A. hypogea* the stipes proceeding from the torus, at the end of which the ovary is formed, lengthened out even to 3 or 4 inches; but the ovary never enlarged, and remained in the same state till the plant perished; and this I observed in many ovaries of many individuals. On this occasion I made the following observations on the flower of this plant. The calyx-lobes are membranous, their base is produced into a filiform somewhat fleshy tube, the alary and carinal petals (wings and keel) are membranous and appear articulate on the calyx, at least they readily separate without laceration; but the vexillum, which is somewhat fleshy, especially at the base, is intimately consolidated at the base with the base of the staminal tube, and both are continuous with the calycinal tube—a circumstance which induces me to believe that the filiform part of the base of the calyx does not consist of that alone, but also of the consolidated bases of the vexillum and of the staminal tube. The *Voandzeia subterranea*, whose slender and somewhat compressed stems spread along the ground, and even penetrate under the surface when the soil is sufficiently soft and porous, produces on the surface of the soil its small pale yellow and slightly greenish flowers, the peduncle drying up immediately if the ovary cannot penetrate the ground; and thus I can affirm that neither the one nor the other of these Leguminosæ produces aerial pods.

On this occasion I may observe that, notwithstanding all the care and attention I could bestow, I failed to discover those female apetalous flowers mentioned by Sprengel (under *Cryptolobus*), by DeCandolle ('Prodromus'), by Lindley and Moore ('Treasury of Botany'), and by Bentham and Hooker (Gen. Pl. i. 539) *. The flowers in twelve individuals examined in the plantation I made were all uniform, and provided with petals (papilionaceous). The peduncle is slender, of variable length, terminated by a nodosity, on which are inserted one or two pedicellate flowers, of which one constantly falls off, carrying the ovary with it; the remaining one, after the petals have fallen, turns downwards enclosed in the calyx, which persists for a considerable time; the pedicel curves so as to present the nodosity downwards—a disposition of which the object is to protect the ovary, and indispensable to enable it to penetrate into the ground, which would not otherwise take place, the peduncle being filiform and incapable of offering any resistance; thus, however, it penetrates perpendicularly into the soil to the depth of 4 inches or more, and there the pod finally ripens. The fact of my not having seen these female apetalous flowers, mentioned by botanists of the first authority, suggests the following queries:—Has the existence of these apetalous flowers been verified? and if so, are they constant on all individuals? Has the transference of the plant from Africa to Brazil had sufficient influence over it to cause their disappearance? Has the ovary, after the fall of the petals, but still enveloped at the base by the persistent calyx, been mistaken for a female apetalous flower? Or have these flowers really escaped my observation? These are questions which I cannot at present definitively solve; but I shall make a fresh plantation and see whether I can discover any thing. In the mean time it appears to me to be placed beyond all doubt that the hermaphrodite petaliferous flowers do produce fruit.

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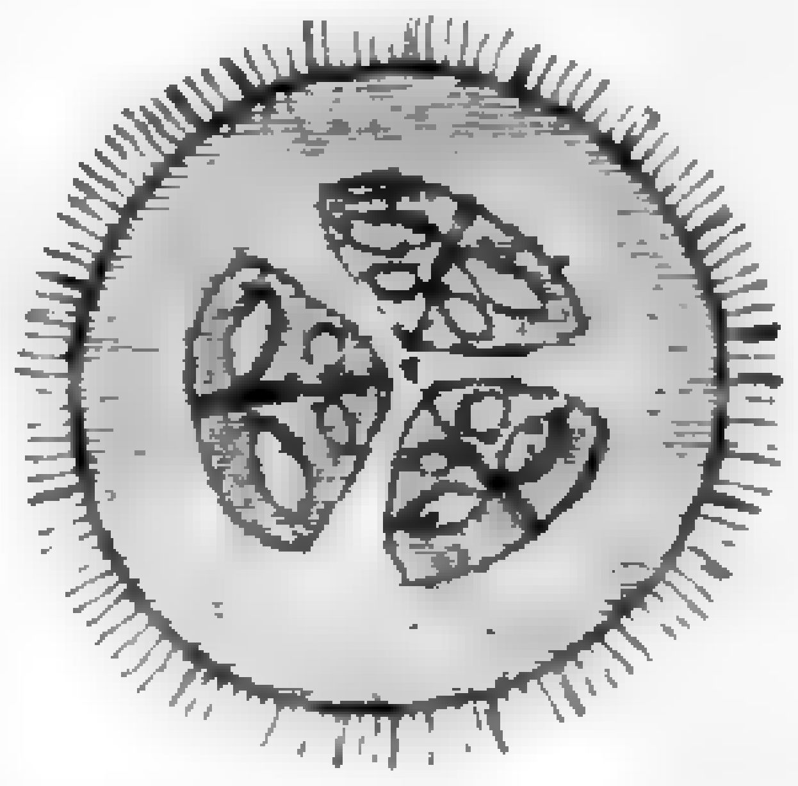
* "Flores apetali non satis noti," *Benth. et Hook. l. c.*

The Order of Cucurbitaceæ is here represented by very few genera; but they appear to me to be particularly interesting, not only because the genera to which they belong are very insufficiently known, but for the medicinal properties which some of the species possess. The rapidity with which the flowers fade and lose their shape, often resolving into a paste, has caused me serious difficulties; so that, to enable me to study them and have them drawn, I have been obliged to plant many of them in my garden: and even here the difficulties have not been completely overcome; for, in some species, I have only been able to procure one of the sexes. From the few observations which I have hitherto made, I can say that *Perianthopodus* of Manso is generically the same as *Trianosperma* of Martius, there being only a small difference of very little importance, which is, that the fruit of the former contains usually one, sometimes two seeds, but little compressed, with a callus at the base, whilst in a *Trianosperma* very common in this neighbourhood, and which may well be *T. ficifolia*, Mart., the fruits contain usually two, sometimes three compressed seeds without any basal callus.

Of the genus *Wilbrandia*, Manso, there must be at least two species; the one is *W. hibiscoides*, Manso, the other the *W. drastica*, Mart., or *W. Riedeli*, Manso, Enum. 50, note *e* (*Momordica verticillata*, Vell. Fl. Flum. ic. x. t. 96). The first is frequently to be met with in the virgin forests and capoeiras near this town. The flowers are monœcious or diœcious; that is to say, some individuals produce male flowers only, others female flowers only; in others, again, when they commence flowering, the flowers are all males; later, males and females are produced in the same axils, and finally females only. In this species the male flowers are crowded at the end of a peduncle, which lengthens as the flowers are developed, which takes place from the base upwards. The fruit, about an inch, more or less, in length, is ovoid or ovoid-oblong, attenuate towards the end, and 10-ribbed and terminating in a point or beak formed by the persistent calyx-tube (which is produced above the ovary). I have never seen the second species; but its fruits are, according to Manso, smooth (not ribbed), and the spikes of the male flowers elongated, which agrees well with the above-cited figure of Vellozo, in which the fruits are represented as not ribbed, and the male flowers as somewhat distant from each other.

The genus *Cayaponia* of Manso is, without doubt, very near to *Trianospermum*, Mart., from which it only differs in the number of ovules in each cell of the ovary. The *Cayaponia diffusa*, Manso (which I believe to be identical with the *C. elliptica*, Manso, Enum. Subst. Bras. 32, where, by a clerical error, it is named *Dermophylla elliptica*, and which I also suppose to be the same as *Bryonia pilosa*, Vell. Fl. Flum. ic. x. t. 86), is common in the woods in low moist situations (occurring also sometimes in high and dry places) in the neighbourhood of this town. The ovary in this species is 3-celled, with 12 ovules, the ovules erect, superposed two and two, and separated from each other by a membrane; each cell is divided along the centre longitudinally by a spurious septum; and each one of these partial cells (limited on one side by a true septum, on the other by a spurious one) has two superposed ovules, each one in a cellule of its own, there being thus four ovules in each true cell (see fig. 1). On the other hand, in *Trianosperma*, the ovary contains only one or two ovules in each cell. Of *Cayaponia cabocla*, Mart. Syst. Mat. Med. Bras. 81 (*Bryonia cabocla*, Vell. *l. c*, t. 88, or *Cayaponia globosa*, Mans. Enum. *l. c.* 82), I have seen a branch with ripe fruits. The fruits of this species are 3-celled, and in each cell there are often four seeds, from which I conclude that the ovary must be more or less

Fig. 1.



Transverse section of the ovary of *Cayaponia diffusa*, Manso, magnified, The funicle of each outer ovule is much longer than that of the inner one, raising the ovule higher up, so that, in a transverse section, the outer ones appear longer than the inner.

similar to that of *C. diffusa*, and that it must belong to the genus *Cayaponia* of Manso. To this same genus belong probably *Dermophylla pendulina*, Manso, *l. c.* 31, and *Bryonia ternata*, Vellozo, *l. c.* t. 91. As to the position of the genus *Cayaponia* in the Order, although it cannot be included in the tribe Abobreæ, Naud. (Benth. et Hook. Gen. Pl. i. 819), in which the number of ovules is limited to two in each cell at the most, it cannot, nevertheless, cease to be placed next to *Trianosperma*, from which it does not essentially differ, except in the greater number of ovules in each cell of the ovary. I have said above that I suppose the *C. diffusa* of Manso to be identical with the *Bryonia pilosa* of Vellozo. I have been led to this conclusion from the excessive diversity of shapes represented in the leaves of *C. diffusa*, sometimes scarcely angular, and very similar to those of *B. pilosa* of t. 86, Fl. Flum., sometimes more or less deeply 3–5- or 7-lobed, with broad or with almost linear lobes; and I have seen leaves of all these different shapes on one and the same individual; but when they are seen separate on different specimens, one is led to suppose the existence of three or more distinct species.

The *Hypanthera* of Manso is probably identical with *Fevillea*, Linn. The *H. Guepira*, Manso, is the same as *F. cordifolia*, Vell. Fl. Flum. ic. x. t. 1 & 2, which, according to Martius, is the *F. trilobata*, Linn. The anthers of *Fevillea* are 2-celled, but so organized that, after the emission of the pollen (which takes place through a single slit in the anterior face of the anther), they appear to be 1-celled; but if they are examined in the bud it will be seen that the connective is produced into the polliniferous cavity, so as to divide it longitudinally into two perfect cells, and that after the emission of the pollen it withdraws itself, so as to give the unilocular appearance, a structure identical with that which has been so well observed by Dr. G. Dickie (Journ. Linn. Soc. x. 54) in the anthers of *Canna speciosa*, and which occurs also in the three species of *Canna* which inhabit this place.

With regard to *Fevillea*, the question arises whether the ovary is really, as described, 3-celled, and the seeds in the fruit inserted on a trigonous axis. The margins of the three carpels which compose the ovary in this plant are very much intruded, and meet in the centre of the ovary, but are not consolidated and do not cohere with each other excepting close to the base of the ovary. Each of these margins bears 3 pendulous and compressed ovules (6 in each false-cell). The seeds, large, orbicular, flat, and bordered by a narrow membrano-suberose margin and imbricate one over the other, are pendulous, not from a trigonous axis, but from the margins of the carpels, which have become thick and fleshy, and with the ripening of the fruit have withdrawn from each other, being contiguous and adherent only close to their base.

The genus *Anisosperma*, Manso, whose typical and only species is the *A. passiflora*, Manso (*Fevillea passiflora*, Vell. Fl. Flum. x. t. 104), is an excellent genus; the name, however, is bad; for it is founded on an anomaly in the fruit examined by Manso, which contained in one of the cells nine seeds, and in each of the two others one large seed, which filled the whole cell, whereas in one of these fruits lately examined there were eight seeds in each cell. As, however, the name does not clash with any other, and as, moreover, it is possible that the above anomaly may be frequent, I see no inconvenience resulting from the use of the name, nor any need of substituting any other for it. The principal characters of the plant are the following:—

> *Flores* dioici, racemosi. Fl. ♂. *Calyx* 5-fidus, externe pallidissime virens et sparsim pubescens, basi hemisphæricus, lobi ovato-oblongi, erecto-patentes, incurvi, leviter concavi, membranacei, obtusi, intus concolores glabri. *Corollæ* petala 5, alba lævissime virentia, lineari-lanceolata, per $\frac{2}{3}$ altitudinis suæ erecto-patentia, dein subito centrum floris versus incurva, basi latiora carnosula et cuneiformia, apice acumine acuto terminata (3 in apicem gradatim attenuata, 2 sub apice abrupte contracta), in parte superiore membranacea, in fundo calycis inserta, et basi cum illo ita connata ut nonnisi laceratione separanda. *Stamina* 5, libera, in fundo calycis inserta et cum petalis alternantia; filamenta albida, brevia, teretia, basi crassiuscula approximataque, apice divergentia; antheræ elliptico-oblongæ, introrsum adnatæ, utrinque obtusæ, sulco unico longitudinali percursæ, ibidemque dehiscentes pollen ex utroque loculo emittentes; connectivum cum filamenti parte superiore continuum, crassum, plano-convexum, loculos ante dehiscentiam non excedentem et vix post pollen emissum eos superans, intra antheram longitudinaliter penetrans et in loculos 2 dividens more antherarum *Fevilleæ cordifoliæ*, Vell., et generis *Cannæ*; pollinis granulæ oblongæ. *Ovarii* rudimentum et discus desunt.—

Flores ♀. *Calyx* ovario adhærens et supra illud in columnam parvam constrictus, limbus (supra constrictionem) subcampanulatus, lobis corollaque iis floris ♂ similibus. *Staminum* rudimenta nulla. *Ovarium* oblongum, glabrum, imperfecte 3-loculare, carpellorum nempe marginibus valde intromissis et inferne fere usque ad tertiam partem in medio ovario connatis, superne tamen vix inter se contingentibus nec cohærentibus, et in parte superiore libera sola placentiferis; ovula in quoque loculo 8 v. abortu pauciora, a marginibus carpellorum pendula, partem superiorem loculorum occupantia (inferiore vacua), in series duas verticales (4 in quaque placenta) disposita, septo parallele compressa subulataque, anatropa, micropyle supera, raphe ad angulum internum loculi spectante. *Styli* 3, erecti, in parte inferiore subcrassiores, superne dilatati in laminam late obcordiformem erectam planam, longitudinaliter introrsum curvatam, margine irregulariter eroso-crenatam, ad faciem utramque stigmatosam. *Fructus* magnus (3½–6 poll. diametro majore, 2–4½ poll. diametro minore), ovoideo-oblongus v. ellipsoideo-oblongus, subtrigonus, glaber v. sparse irregulariterque verrucosus, carnoso-corticosus, indehiscens, basi a limbo calycis haud zonatus, apiculo parvo conoideo terminatus. *Semina* magna (circa 10 lin. diametro), orbiculata, compressa, ala membranaceo-suberosa 1½–2 lin. lata cincta, mutua pressione plus minus angulata, testa crassa, crustacea, extus granuloso-punctulata, colore pallide fusca, membrana tenui suberosa adhærente obtecta, intus substantia subero-fungosa albida farcta, a marginibus placentarum in parte superiore loculi pendentia, deorsum imbricata, interdumque mediante superficie testæ inter se cohærentia, 8 in quoque loculo in fructibus perfecte evolutis, in fructibus minoribus pauciora; nec in pulpa nec in substantia fibrosa involuta. *Cotyledones* seminis forma, acumine brevi in parte superiore, crasso-carnosæ, oleosæ, albæ, sapore intense amaro, radicula supera. *Placentæ* (septa) crasso-carnosæ, in parte superiore segregatæ, in inferiore inter se connatæ.—*Frutex* scandens, radicibus paucis, horizontalibus, nec tuberosis. *Caulis* teres, succosus, 1½ poll. plus minusve diametro, superficie rugulosa, dense lenticillata, colore cinerascenti-virescente; supra arbores scandens et in ramos longos tenuesque divisus ramulosque longissimos ferens, qui si arbor sustentans separatim crescit, a fronde dependentes fere ad terram attingunt iterumque surgentes mediantibus ramis propriis serta formant densa ab arbore pendentia. *Lignum* molle, tubis numerosis diametro magna percursum, et cuneatim a radiis medullaribus divisum. *Rami* teretes, 7-sulcati, novelli fulvo-purpurei virescentes tenuiterque pubescentes pilis argenteis adpressis, vetustiores virides glabrique. *Folia* petiolata, alterna, integerrima, oblonga v. ovato-oblonga, novella lævia carnosulaque, siccitate membranacea et minute tuberculosa; lamina pendens, margine membranacea, basi triplinervis, apice penninervis, biglandulosa, breviter acuminata, acumine acuto v. subobtuso, basi rotundata v. angustata, usque ad 6 poll. longa et 4 poll. lata; nervi 7–8, in vivo costa media et nervi 2 laterales ad basin vix prominentes, cæteri impressi reti venulorum inconspicuo, in sicco nervi utrinque prominuli et rete venulorum e maculis latis compositum distinctius apparet. *Folia* novella carnuloso-membranacea sparse pubescentia pilis iis caulis similibus, viridi-purpurascentia et utrinque nitida, adulta obscure viridia subcarnosa supra lucidula v. glaucescentia, subtus pallidiora, petiolus basi teres superne vix sulcatus, fere semper crassior quam ramus cui insidet, in foliis majoribus 4–8 lineas longus; glandulæ ovatæ, acutæ, minute depresso-punctatæ, in foliis novellis patentes, in adultis ad faciem dorsalem declinatæ, ad utrumque latus ad marginem laminæ juxta petiolum sitæ (nec supra basin laminæ ut in icone Vellosiana delineantur). *Cirrhi* filiformes, apice bifidi, lateraliter paulloque supra basin petioli inserti. *Flores* pendentes, pedicellati, parvi (corolla fl. ♂ 1½–2 lin. diametro et fl. ♀ vix major; ovarium 3–4 lin. diametro majore, 2–2½ lin. diametro minore; alabastrum ovoideo-globosum, paullo ante explicationem ¼ lin. diametro); pedunculus solitarius, uti cirrhi ad basin petioli lateralis, inter cirrhum et petiolum insertus, brevissimus (1–6 lin. longus), tenuis; pedicelli compressi usque ad 7 lin. longi, basi bractea instructi parva triangulari acuta, uti pedunculus pedicellique pubescentes, pilis brevibus sparsis patentibus albisque. *Pedunculus* florum ♂ nunc indivisus floribus in racemum longum simplicem dispositis, nunc 2–5-partitus paniculam formans laxam: floribus in utroque casu seriatim nec minus evolutis, pedicellis filiformibus medio v. infra medium articulatis; florum ♀ indivisus, floribus paucis (2–4), pedunculo pedicellisque paullo crassioribus quam in ♂, pedicellis cum calycis basi (v. ovario) articulatis.

The plant grows in virgin forests and elevated capoeiras, in high and dry situations, and is rare in the vicinity of this town. The males are in flower from September till April, the females only from December to March; the fruit ripens in June. The plant resembles much, in habit as well as in the shape of the fruit, the *Passiflora quadrangularis*. I have already observed that the anthers, at first bilocular, opening by a single slit, become unilocular after the emission of the pollen, by the withdrawal of the dissepiment or intruded connective; this gives rise to the question, Are the anthers of the species comprised in the tribes Gomphogyneæ, Gymnostemmæ, and Zanonieæ, which are said also to be bilocular, of the same structure as those of the above-described *Fevillea*?

As to the place of *Anisosperma* in the Order, some of its cha-

racters, such as the absence of any trigonous axis in the fruit, the existence of a wing surrounding the seed, the apparently 1-celled anthers, the leaves entire, as in some species of *Zanonia* &c., harmonize well with those of the plants comprised in the tribe Zanonieæ, *Benth. et Hook.*, and in some measure induces the including the genus in that tribe; but, considering that the fruits of Zanonieæ are dehiscent, with a trigonous terminal aperture, and, on the other hand, that in the fruits of *Hypanthera Guapeva*, Manso, which belongs undoubtedly to the genus *Fevillea*, there is also no trigonous axis, the seeds being inserted on the margins of the placentas, that its seeds are winged and the anthers constructed as in *Anisosperma*, it appears to me that the place of the latter genus must be in the tribe Fevilleæ, *Benth. et Hook.* During the time that illness obliged me to break off this letter, I received the fruits of this plant, which have served me for the present description; and as, after analyzing several of them, I never found eight or nine seeds in one cell and only a single one in the two others, it would appear that Manso's name *Anisosperma* is founded on a character absolutely false, and may have to be changed for some other name.

Besides the above-mentioned Curcubitaceæ we have a *Melancium*, probably the only species of the genus, which is very common in the campos about this town, the *Sicana odorifera*, Naud. (*Cucurbita odorifera*, Vell.), which is cultivated on account of the aroma of its fruits, &c.

The Order Menispermaceæ consists here of three species of *Cissampelos*, and one other plant, which grows in moist places, in ravines, beds of rivers, &c., of which I have some male specimens, and which I believe to be *Odontocarya*, Miers, Benth. et Hook. Gen. Pl. i. 960 & 31, 34, under *Chondrodrendon*. Enclosed is a small specimen.

Euphorbiaceæ are here represented by a large number of genera, but for the greater part monœcious: the diœcious ones are very few; those that I have met with are:—one or two species of *Pera*, Mut.; a *Tetrorchidium*, Pœpp. et Endl., probably the *T. rubrivenium*, and *trigynum*, Müll. Arg.; an *Alchornea*, of which I have only seen the female flowers, but which is doubtless *A. latifolia*, Sw.

The Myrtaceæ with baccate fruits occur in great numbers; of those with capsular fruits, I have only seen two or three species of *Curatari*, of which one, the *C. legalis*, Mart., known commonly by the name of *Jiquitibá*, is remarkable for its gigantic proportions.

The Scitamineæ (Cannaceæ, *Agardh*, Zingiberaceæ, *L. C. Rich.*, and Musaceæ, *Agardh*) have but few representatives. Of the Cannaceæ, I know of three species of *Canna*, one with flowers of a deep scarlet, which is cultivated in our gardens, and which appears to me to be the *C. Warszewiczii*, Dietr., from Costarica. The two others are the *Muru* and the *Albará* or *Herva dos feredos* of Marcgrav and Piso, known also by the names of *Imberi*, *Beri*, and *Berú*, of which the first, according to Martius (Syst. Mat. Med. Bras. 105), is the *C. aurantiaca*, Rose, and the other *C. glauca*, Linn. Besides these, some species of the genera *Phrynium* and *Maranta* occur in our woods. In our gardens a *Maranta*, probably imported, whose flowers I have not yet seen, is cultivated for the tuberiform rhizomes, from which is extracted a flour, the *arareite* or arrowroot. Of Zingiberaceæ several imported species are cultivated; among spontaneous ones there is an *Alpinia*, probably *A. aromatica*, Jacq., which, according to Martius, is identical with the *A. racemosa*, Vell. Fl. Flum. i. t. 3, known commonly by the name of *Pacová* or *Pacobá*; the root and the seeds are aromatic; and although their aroma is not so agreeable as that of *Elettaria cardamomum*, Mart., they may well be substituted for it in medicine. The *Costus Pisonis*, Lindl. (*C. arabicus*, Vell. Fl. Flum. i. t. 5), commonly called *Paco caatinga*, *Canna do mato*, *Perina* (Marcgr. and Piso), is now better known under the names of *Canna de Macaco* and *Canna do brejo*, and is common under the shades of the moist virgin forests of the neighbourhood of this town. Of Musaceæ and the genus *Musa*, besides the *M. paradisiaca*, Linn., *M. sapientum*, Linn., and *M. sinensis*, Sw., and their divers varieties, which are here cultivated, I have seen a *Musa* growing in the woods near the town of San Paolo. This *Musa* has considerable analogy to the *M. coccinea*, Willd. (Walp. Ann. vi. 38), from which it differs in the shape of the teeth of the anterior lip of the perianth, of which the three anterior ones are smaller, rounded, and united with each other higher up, the two lateral ones broader and ovate-triangular, the posterior lip linear, of an equal breadth through its whole length, suddenly attenuated at the top, and the margins of both lips thinly membranous and entire, whilst in *M. coccinea* the lobes of the posterior lip, as well as the anterior lip, are differently shaped. The false stem of the San-Paolo species acquires a height of 8 or 9 palmas and a diameter of 2 inches, the leaves are ovate-lanceolate, abruptly acuminate, broad, and unequally rounded at the base. The bracts are of a deep scarlet colour, the fertile flowers (♀) usually solitary in the axils of the lower bracts, the sterile ones (♂) two together in the axils of the upper bracts, the spadix erect. Of the genus *Heliconia* I have seen two species, one with the spathes but little conspicuous, which occurs sometimes in the woods near this town; the other, whose characters agree well with the *H. latispatha*, Benth. (Walp. Ann. i. 811), differs from the genus in that the fruit is a berry (trigonous, pedicellate, of a blue slightly purplish colour, 1- to 3-seeded), and not a 3-valved capsule. It so far establishes a passage from the genus *Heliconia* to that of *Musa*; and it will be necessary either to make a new genus for it, or to reform the character of *Heliconia* as to the fruits, so as to enable it to comprehend this species. This Musacea is probably already known; for it is very common from the middle to the base of the Cordillera called *Serra de Santos*, and occurs also in the Litoral.

Irideæ, besides the numerous species cultivated for ornament in our gardens, are represented here by very few species.

Of all these plants I shall send you specimens, accompanied by descriptions and drawings, to the best of my ability.

Joaquim Correa de Mello.

Campinas, June 3, 1869,

On *Myrocarpus frondosus*, Allem. By J. Correa de Mello, of Campinas, in South Brazil. (Translated from the Portuguese, with a Note, by G. Bentham, Esq.)

[Read February 3, 1870.]

Myrocarpus frondosus, *Allem. Diss.* 1847 *et* 1848, *cum ic.* Calyx tubulosus, obconicus, rectus, breviter 5-dentatus, vix a latere compressus, infra medium (ad disci marginem) leviter constrictus, parte discifera carnosula, supra discum membranaceus, nervis 5 tenuibus in apices dentium terminantibus percursus, extus tenuiter pubescens; dentibus inter se æqualibus, æstivatione varie imbricatis, ad marginem disci haud divisis (sepalis ultra discum coalitis). *Discus* in fundo calycis, tenuis, viridis. *Petala* 5, inter se æqualia, obovato-linearia, apice rotundata concavaque, membranacea, medio nervo tenuissimo virescente percursa, ineunte anthesi alba patentiaque, mox leviter flavicantia, ad marginem disci extra stamina inserta, in alabastro vix imbricata, summo intimo, cæteris varie imbricatis. *Stamina* 10, libera; filamenta (in alabastro haud incurva) subulata, alba, glabra, quorum 5 alterna citius evoluta jam ad corollæ explicationem exserta, dum altera 5 vix ad marginem calycis attingens, hæc tamen sensim accreta demum priora longitudine æquant; antheræ flavæ, staminum primum evolutorum late ovatæ, cæterum late obovatæ; pollinis granulæ oblongæ, utrinque obtusæ, sulco longitudinali notatæ. *Ovarium* in fundo calycis stipitatum.—*Arbor* folia tempore æstatis dimittens, mense Augusto ante foliorum evolutionem florens. *Flores* odore grato, racemosi; pedicelli basi bractea parva late ovate-subtriangulari acuta, primum membranacea mox scariosa fulti; bracteolæ 0. *Racemi* cylindrici, recti, erecti, solitarii v. 2–3-ni (2–5-ni ex Allemão), alterni, pedunculo communi brevi inserti, paniculam parvam formantes, his ad apicem ramulorum v. supra cicatrices foliorum delapsorum sitis, sæpe in ramorum parte superiore numerosis approximatis, paniculam amplam simulantibus. *Florum* evolutio sæpe ab apice basin versus racemi progreditur, sæpeque gemmæ rami cujusdam magni omnes floriferæ sunt nec folium ullum evolvitur.

From incisions made in the trunk of this tree issues a balsam, at first transparent, of a yellow colour, and of an aroma not very sweet and somewhat terebinthine; but by exposure to the air it assumes a red colour and a fragrant aroma, and is indubitably the balsam "Caburé-icica" mentioned by Piso, 'De Medicina Brasiliensi,' lib. 4, cap. v. p. 57, and by Martius, 'Syst. Nat. Med. Veget. Bras.' 115.

This *Myrocarpus*, in its botanic properties and the odour of all its parts, resembling those of the corresponding parts of *Myroxylon peruiferum*, Linn., has great affinity with the genus *Myroxylon*. Bentham and Hooker (Gen. Pl. i. 559), who could not ascertain the æstivation of the corolla from not having seen it in bud, observe the affinity of *Myrocarpus* on the one hand with *Sweetia*, and on the other with *Sclerolobium*; but, considering that the structure of the calyx is rather that of the *Sophoreæ* than of the *Cæsalpinieæ*, they place the genus in the suborder *Papilionaceæ* and the tribe *Sophoreæ*. But as the upper petal is, as above mentioned, always inside in estivation, it appears beyond doubt that *Myrocarpus* must be removed to the suborder *Cæsalpinieæ* and the tribe *Sclerolobieæ*, which comprises species with imparipinnate leaves like those of *Myrocarpus*. In the tribe it would be placed next to *Pœppigia*, which contains species in which the calyx-lobes are united above the disk.

J. Correa de Mello.

The observations of Sen. Correa de Mello would perhaps have determined the removal of *Myrocarpus* to the Sclerolobieæ, if the æstivation described by him were constant. With the above Notes he remitted several racemes in bud, which have been carefully examined. In them we found the estivation of the petals still more variable than is mentioned by Mello; for the upper, or posterior petal, although occasionally inside, as he describes it, is more frequently partially outside, overlapping one of the lateral petals on one side, and being overlapped by another lateral petal on the other side. In one flower, at least, the upper petal was entirely outside; and in another the estivation was contorted, each petal overlapping an adjoining one on one side, the imbrication in all cases slight, and only observable in the upper portion of the bud. *Myrocarpus*, then, like one species of *Sweetia* where a similar diversity of estivation has been observed, must be regarded as one of the few connecting links between the large suborders Papilionaceæ and Cæsalpinieæ; and as in other respects it is evidently more closely allied to *Myroxylon* than to any Sclerolobieæ, we should prefer leaving it in the place assigned to it in our 'Genera Plantarum,' between *Myroxylon* and *Sweetia*.

The course of expansion of the flowers, from the apex to the base of the raceme, pointed out by Correa de Mello is unusual in Leguminosæ, but not quite exceptional, nor yet does it appear to be of any systematic importance; for it has been observed, for instance, in two or three Australian species of *Crotalaria*, whilst the development is normal in closely allied species.

Since writing the above, I have received M. Baillon's observations on Cæsalpinieæ, in the first vol. of his 'Histoire des Plantes,' from which it appears that he has found in *Cadia*, Forsk., and in *Barklya*, F. Muell., the same variable æstivation as that observed, as above, in *Myrocarpus*. He therefore proposes to remove those two genera to Cæsalpinieæ, although they have both, in a very decided manner, the hooked radicle of Papilionaceæ. It still appears to me, however, a more natural arrangement to maintain the Sophoreæ as limited in our 'Genera Plantarum,' as a somewhat variable group, including a large proportion of very distinct monotypic, or almost monotypic, genera probably of great antiquity and constituting in various ways connecting links between the two great suborders *Papilionaceæ* and *Cæsalpinieæ*, but yet more nearly allied to the former than to the latter.

G. BENTHAM.

Review of the Genus *Hydrolea*, with descriptions of three New Species. By ALFRED W. BENNETT, M.A., B.Sc., F.L.S.

(Plate I.)

[Read November 18, 1869.]

THE position of the order Hydroleaceæ has undergone several changes at the hands of botanists. By the older authorities, particularly Jussieu, its genera were included among Convolvulaceæ, from which order, however, they are distinguished in a marked manner by their multiovular ovaries, straight embryo, and several other characters of importance. Lindley, in his 'Vegetable Kingdom,' united the order to Hydrophyllaceæ, to which opinion Alph. DeCandolle appeared to incline, from a note appended to the ninth volume of the 'Prodromus.' Prof. Choisy, in his monograph of the order, and in the synopsis which he contributed to the tenth volume of the 'Prodromus,' clearly showed that this theory is inadmissible, the unilocular few-seeded ovary, parietal placentation, and leaves frequently deeply divided, of the one order, distinguishing it most clearly from the bilocular many-seeded ovary, axile placentation, and leaves invariably simple, of the other order; and that, in accordance with the opinion of Robert Brown and others, the Hydroleaceæ must be raised to the rank of a separate order. The variation, however, in the mode of dehiscence of the capsule compels its subdivision into two suborders, septicidal in Hydroleæ, loculicidal in Nameæ. The tendency which exists in several species of *Hydrolea*, to substitute for the normal bilocular a trilocular ovary, would appear to indicate a closer affinity to Polemoniaceæ than has been generally supposed. From Solanaceæ they differ by their two styles and straight embryo; from Scrophulariaceæ by their regular corolla, five equal stamens, and two styles.

As regards geographical distribution, the order is essentially tropical and subtropical, and especially American. The genus *Hydrolea*, which is nearly synonymous with the suborder Hydroleæ, ranges from Arkansas to Montevideo, with a few Asiatic and African species, to which I am able to add two, hitherto undescribed, from Tropical Africa, contained in the Kew Herbarium. The suborder Nameæ is exclusively American, the species being mostly natives of Mexico and Peru. The Hydroleaceæ are herbaceous or subfruticose plants, the leaves and branches sometimes glabrous, more often clothed with a viscid glandular pubescence, sometimes, in the genus *Wigandia*, with acrid stinging glands; other species are armed with sharp spines. The branches and leaves are alternate, the latter always simple, entire or serrated, generally stalked, and exstipulate. The flowers are hermaphrodite, sympetalous, regular, generally blue, sometimes very handsome, often arranged in corymbs, or scorpioid cymes. They are mostly inhabitants of dry places, some species, however, of marshes and the margins of rivers, especially the *Hydroleæ*; and, as Choisy remarks, this genus is the only one in the order which is distributed over both hemispheres. The best descriptions are to be found in Choisy's 'Synopsis' in the tenth volume of DeCandolle's 'Prodromus,' and in his more extended 'Description des Hydroléacées,' from the Memoirs of the Soc. Phys. et d' Hist. Nat. of Geneva, contained in the 'Annales des Sciences Naturelles,' 1st series, vol. xxx. and 2nd series, vol. i.

The genus *Hydrolea* is distinguished from all the other genera of the order, except Petit-Thouars's very unsatisfactory Madagascan *Hydrolia*, by the bilocular capsule dehiscing septicidally, the single dissepiment bearing in the middle two fleshy fungus-like placentæ, and is therefore practically coextensive with the suborder Hydroleæ. The species are herbaceous or subfruticose, glandular-pilose or glabrous; sometimes armed with axillary spines; the leaves alternate and entire; the flowers blue, often very conspicuous, axillary or corymbose, yielding a yellow fragrant oil.

Linnæus knew only one species of *Hydrolea* (besides two others described under other genera); Choisy, in his 'Description des Hydroléacées,' makes eight, and in DeCandolle's 'Prodromus' eleven. A careful examination of the specimens preserved in the Herbaria at Kew and the British Museum, and of the American species in those of Berlin, Munich, and Vienna, induces me to increase this number to thirteen, by the suppression of two doubtful species, and the addition of one already described by Grisebach, and of three new species, two of which are from Tropical Africa, and one from Brazil.

The authorities for the genus are as follows:—viz. *Hydrolea*, Linn. Gen. 318; Gärtner, vol. i. p. 263, t. 55; Aubl. Guian. t. 110; Cavanill. Ic. t. 529; Bot. Reg. t. 566; Kunth in Humb. et Bonpl. Nov. Gen. et Sp. vol. iii. p. 125; Wight, Ind. Bot.

t. 167; Chois. in Mém. Soc. Phys. et d' Hist. Nat. Gen. vol. vi. p. 107, t. 1, et Annal. Scien. Nat. 1^{e} sér. vol. xxx. p. 236, t. 16. f. 1; DC. Prodr. vol. x. p. 180; Endl. Gen. Plant. p. 661.—*Namæ* sp., Linn. Flor. Zeyl. t. 2.—*Steris*, Linn. Mant. 54; Burmann, Flor. Ind. p. 73, t. 39. f. 3.—*Lycium*(?), Linn. sp., 278.—*Sagonea*, Aubl. Guian. vol. i. p. 285, t. 111.—*Reichelia*, Schreber, Gen. p. 512.—*Hydrolia*(?), Thouars, Gen. Mad. no. 29; DC. Prodr. vol. x. p. 182.—*Wigandiæ* sp., DC. Prodr. vol. x. p. 184.

Descr. *Calyx* 5-sepalus, fere usque ad basin partitus, circa fructum persistens. *Corolla* sympetala, rotato-campanulata, apice 5-loba. *Stamina* 5, æqualia, corollæ tubo inserta, et ejusdem lobis alterna; filamenta basi spathulato-dilatata; antheræ sagittatæ, longitudinaliter dehiscentes. *Ovarium* bi- vel interdum triloculare, disco lato crateriformi cinctum. *Ovula* numerosa, parva, in placentis duabus hemisphæricis carnosis in medio dissepimenti disposita. *Styli* duo, vel rarius tres, distincti, elongati, divergentes. *Stigmata* capitata. *Capsula* globosa vel elliptica, bi- vel rarius trilocularis, inter stylos septicida. *Semina* permulta, minuta; embryo in axi albuminis dense carnosi orthotropus.

The subdivision of the genus presents considerable difficulties; but I have thought it best, on the whole, to retain Choisy's (into two sections, the spined and the unarmed), although it is not to be depended on as constant.

A. Spinosæ.	
a. Folia pubescentia.	
Folia lanceolata, pilosissima; semina striata.	1. *H. spinosa.*
Folia lanceolata, vix pubescentia	2. *H. ovata.*
Folia utrinque attenuata; spinæ recurvæ.	3. *H. paludosa.*
b. Folia glabra.	
Caulis hispidus, geniculatus	4. *H. quadrivalvis.*
Folia lineari-lanceolata; caulis glaber, erectus, subsimplex; sepala lineari-lanceolata, glabra; semina reticulata	5. *H. elegans.*
Caulis glaber, decumbens, ramosus	6. *H. nigricaulis.*
B. Inermes.	
a. Folia pubescentia.	
Flores parvuli; sepala glandulosa	1. *H. spinosa*, var. *inermis.*
Flores magni; sepala eglandulosa	7. *H. megapotamica.*
b. Folia glabra, lanceolata vel latiora.	
Sepala ovato-lanceolata, glabra; semina striata	8. *H. glabra.*
Sepala hispida; flores corymbosi	9. *H. corymbosa.*
Sepala linearia, petalis longiora..........	10. *H. zeylanica.*

c. Folia glabra, linearia.

Caulis decumbens; flores parvi, conferti; sepala glanduloso-villosa .... 11. *H. multiflora.*
Caulis ascendens; flores magni, corymbosi; sepala angusta.
12. *H. graminifolia.*
Caulis ascendens; sepala triangularia, foliacea.
13. *H. macrosepala.*

1. H. SPINOSA, *Linn.* (Tab. I. figs. 1, 2, 3, 4.)

Caulis ascendens, bi- vel tripedalis, ramosus, magis vel minus hirsutus, plerumque spinosus; rami erecto-patentes, hirsuti; spinæ axillares, erecto-patentes vel patulæ, 5–8-lineares, rectæ, pubescentes. *Folia* elliptico-lanceolata, 2–3 poll. longa, 8 lin. lata, integra, subsinuata, utrinqne pubescentia, breviter petiolata. *Flores* in cymas terminales scorpioideo dispositi, cærulei, pedunculati, fragrantes; pedicelli glanduloso-hirsuti; bracteæ foliaceæ, parvæ, villosæ. *Sepala* lanceolata, 3 lin. longa, basi vix coalita, pilis densis longis glandulosis extus vestita, intus breviter hispida vel subglabra. *Corolla* calyce longior: lobi brevissimi, late triangulari-ovati, per æstivationem imbricati, pilis paucis sparsis præditi. *Stamina* corolla sublongiora, post anthesim exserta. *Ovarium* ellipticum, bi- vel interdum triloculare. *Styli* duo vel rarius tres, demum valde elongati, persistentes, divergentes, apice convergentes, basi leviter glanduloso-hirsuti. *Stigmata* capitata. *Capsula* orbicularis, bi- vel rarius trilocularis, sepalis persistentibus subbrevior; capsulæ apex et stylorum bases leviter glanduloso-hirsutæ. *Semina* parva, numerosa, elliptica, longitudinaliter admodum rugoso-striata.

Var. *β.* INERMIS, *Spruce, MS.* *Caulis* glanduloso-pubescens, inermis.

Hydrolea spinosa, *Linn. Sp.* 318; *Aubl. Guian.* vol. i. p. 281, t. 110; *R. et Pav. Fl. Per.*; *Bot. Reg.* 566; *DC. Prodr.*; *Chois. Descr. Hydrol.*—Hydrolea trigyna, *Sw. Ind. Occ.* vol. i. p. 558; *Cav. Ic.* vol. i. p. 19, t. 529. f. 1.

This species appears to be one of very general and abundant distribution throughout Tropical and Subtropical America and the adjacent islands, growing in ditches, the margins of woods, and damp fields. It is described by Purdie as being "as highly scented as any China rose." It varies considerably in the size of the flowers, the degree of hairiness of the whole plant, and the number of spines—the unarmed variety having been sent by several collectors from Brazil and Guiana. The form with a trilocular ovary and three styles has been erected into a distinct species, and even proposed by Aublet to form a separate genus, under the name of *Sagonea*. I am, however, able to confirm Prof. Choisy's statement, that the 2-styled and 3-styled flowers

may be found on the same plant, and that it therefore cannot even be ranked as a variety. I cannot, however, agree with that eminent botanist's observation, that where the styles and divisions of the ovary are three in number, the stamens, lobes of the corolla, and sepals, are each six, having myself found no variation from the normal number of these organs.

2. H. OVATA, *Chois.*

Caulis herbaceus, ascendens, puberulus; spinæ axillares, patulæ, 3–6-lineares, tenues, rectæ, puberulæ. *Folia* ovato-lanceolata, utrinque attenuata, petiolata, 2 poll. longa, 6 lin. lata, integra, leviter pubescentia vel subglabra, venâ mediâ subtus prominente puberula; folia superiora et bracteæ molliter hirsuta. *Flores* cærulei, racemosi, pedunculati; racemi foliosi. *Sepala* lanceolata, acuta, intus glabra, extus pilosa. *Ovarium* globosum, glanduloso-hirsutum, biloculare. *Styli* duo, longi, curvati, basi glanduloso-hirsuti. *Stigmata* rotunda, disciformia. *Capsula* globosa, bilocularis, calyce persistente brevior, leviter hirsuta.

Hydrolea ovata, *Nutt. MS.*; *Chois. Descr. Hydrol.* t. 1; *DC. Prodr.*

This species, first described by Choisy, presents no very good characters to distinguish it from *H. spinosa*, and may possibly turn out to be simply a form of that plant with broader leaves, the stem and leaves less hairy, the spines less numerous and slenderer, and the flowers somewhat larger, unless the disk-like form of the stigmas presents a better diagnosis. It was first gathered by Nuttall in Arkansas and North Carolina; but specimens collected in Surinam (*Hostmann*, no. 450) and Brazil (*Gardner*, 6067) are clearly referable to the same form.

3. H. PALUDOSA, nov. sp.

Caulis herbaceus, fistulosus, ascendens, subsimplex, hispidus, spinosus; spinæ axillares, patulæ vel plerumque recurvæ, apice curvatæ, 4–5-lineares, pubescentes. *Folia* elliptico-lanceolata, acuminata, utrinque attenuata, breviter petiolata, integra, mollissime pubescentia, 1–2 poll. longa, 3–5 lin. lata, inferne decidua. *Flores* pauci, in foliis superioribus fere occulti. *Sepala* lineari-lanceolata, glanduloso-hispida, petalis in alabastro breviora. *Corolla* cærulea. *Stamina* basi dilatata, corollæ tubo inserta. *Ovarium* ellipticum, glabrum, pilis paucis glandulosis apice præditum. *Styli* duo, longi, subglabri, rectangulate curvati.

This species appears to me quite distinct from *H. spinosa*, and is recognized at a glance by its different habit—its very weak, apparently fistulose, and nearly simple stem clearly indicating an aquatic habit. The spines pointing slightly downwards, the leaves equally narrowed at both ends, often decurved, and always deciduous from the lower part of the stem, are good characters.

The inflorescence is simple, the flowers almost hidden in the leaves or foliaceous bracts. I have only seen specimens from Brazil (where it would appear to be rare), and refer to it those marked "Brazil, T^{da} do Pinhal," *Sello*, no. 703, in the Berlin, and "Ad João d' El Rey, rarissime," *Pohl*, 351, and "in uliginosis prope villam S. Salvador," *Pohl*, 5358, in the Vienna collection.

4. H. QUADRIVALVIS, *Walt.*

Caulis herbaceus, ascendens, infra decumbens, tenuis, geniculatus, subsimplex, pilis longis paucis patulis albis vestitus, vel subglaber, spinosus; spinæ axillares, 2–3-lineares, rectæ, glabræ. *Folia* obovata, breviter petiolata, subcuneata, acuminata, 2–2½ poll. longa, 6–8 lin. lata, glabra, in petiolum 2–3-linearem attenuata. *Flores* in racemos densos, paucifloros (2–6-fl.) axillares aggregati; pedicelli brevissimi, hirsuti. *Sepala* triangulari-lanceolata, extus hirsuta. *Corolla* cærulea, calyce sublongior, profunde 5-partita; lobi ovato-rotundi, obtusi. *Ovarium* biloculare. *Styli* duo vel rarius tres, filiformes, persistentes. *Stigmata* capitata. *Capsula* bilocularis, globosa, glabra, calyce persistente brevior.

Var. *β*. INERMIS. *Flores* sæpe trigyni; spinæ nullæ.

Hydrolea quadrivalvis, *Walt. Car.* vol. i. p. 110; *Elliot, Car.* vol. i. p. 356; *Chois. Descr. Hydrol.*; *DC. Prod.*—H. caroliniana, *Michx. Fl. Bor. Amer.* vol. i. p. 177.

β. inermis. Hydrolea Bartramii, *herb. Brit. Mus. MS.*—H. palustris (?), *Ræusch.*—Sagonea palustris, *Aubl. Guian.* vol. i. p. 285. t. 111. —Reichelea palustris (?), *Schreb. Gen.* 512; *Willd. Sp.* vol. i. p. 1502.

This plant has received the misnomer from Walter, in his 'Flora Caroliniana,' from the idea that the capsule was quadrilocular. It grows in wet boggy places and by ponds in South Carolina, Georgia, and Florida. The variety *inermis*, which has received a good number of synonyms, is only known from a single specimen in the Herbarium of the British Museum, from the banks of a stream in Guiana; I am very doubtful whether it is rightly included under this species.

5. H. ELEGANS, *nobis*. (Tab. I. figs. 5, 6.)

Caulis ascendens, erectus, 1½–2-pedalis, elegans, purpurascens, glaber, spinis numerosis armatus; spinæ axillares, horizontales, 8–10-lineares, teretes, glabræ. *Folia* lineari-lanceolata, 12–15 lin. longa, 4–5 lin. lata, integra, subsinuata, glaberrima, utrinque attenuata, breviter petiolata, venâ mediâ subtus prominente. *Flores* in cymas densas foliosas terminales et axillares dispositi, pedunculati: pedicelli et bracteæ glabræ. *Sepala* lineari-lanceolata, circa 3 lin. longa, acuta, glabra, basi vix coalita, nervo medio prominente. *Corolla* cærulea, calycem duplo superans. *Ovarium* ovatum, bi- vel triloculare, glabrum. *Styli* duo vel tres, elongati, divergentes et demum reflexi staminibus multo longiores, decidui. *Stigmata* capitata. *Capsula* orbicularis, nunc bi- nunc trilocularis, calycem persistentem æquans. *Semina* minuta, reticulato-rugosa, alâ membranaceâ cincta.

Hydrolea spinosa, var. glabra, *Mart. MS. in herb.*—Hydrolea glabra (?), *herb. Brit. Mus. MS.*; *Chois. Descr. Hydrol.*; *DC. Prodr.* —Lycium capsulare (?), *Linn. Sp.*, 278, *ex Smith in Rees's Cyclop.*

I have no hesitation in claiming for this plant (the *H. spinosa*, var. *glabra*, of Martius, in the Munich Herbarium) the rank of a distinct species. In turning over a number of specimens, there is no difficulty in picking them out at once from the more glabrous forms of *H. spinosa* by the difference in habit, arising from the simpler, slenderer, glabrous and purplish stem, which is found to be accompanied by narrower perfectly glabrous leaves, with the mid vein very prominent beneath, and the glabrous sepals always broadest at the base and gradually narrowing to the apex; the styles are also very seldom found attached to the ripe capsules. A very marked, though minute, character is also furnished by the seeds, which, instead of being deeply longitudinally striated as in *H. spinosa* and *glabra*, are reticulated, and surrounded by a membranous wing. I have given the species the name of *H. elegans*, that of *H. glabra* having been already appropriated by Schumacher. Great confusion in nomenclature has been occasioned by Choisy's having altered the name of Schumacher's plant to *H. guineensis*, and then bestowed the name *H. glabra* on a different species which I believe to be identical with this. Although apparently generally distributed throughout Tropical America, and represented in all the German collections (but deficient in that at Kew), this precise form appears to have been unknown to Choisy, who has described his *H. glabra* from a single specimen in the Herbarium of the British Museum, from Nova Hispania, which differs somewhat from the typical form in the sepals being narrower and slightly pubescent, and which may be a glabrous form of *H. spinosa*. Martius describes this species as growing "in depressis hieme inundatis, in prov. Minas Geräes."

6. H. NIGRICAULIS, *Griseb.* (Tab. I. fig. 7.)

Caulis suffruticosus, decumbens, tortuosus, ramosus, glaberrimus, purpurascens, spinosus; spinæ rectæ, teretes, graciles, 4–5-lineares, glabræ. *Folia* lanceolata, glabra, 6–10 lin. longa, 2–4 lin. lata, integra, sessilia. *Flores* parvi, in cymas paucifloras axillares conferte glomerati, sessiles. *Sepala* lanceolata, glabra, 1–1½ lin. longa. *Co-*

rolla "alba," calycem æquans. *Ovarium* ellipticum, glabrum. *Styli* duo. *Capsula* elliptica, minima, 1½-linearis, calycem persistentem æquans, glabra. *Semina* numerosa, minuta.

Hydrolea nigricaulis, *Wright, MS.*; *Grisebach, Catalogus Plantarum Cubensium,* p. 207.

This very distinct and pretty little *Hydrolea* was first described by Grisebach in his 'Catalogus Plantarum Cubensium,' and is found in several English and continental Herbaria, numbered 3108 in Wright's collection. It appears to be confined to Cuba, growing in dried-up pools. Its very glabrous habit, slender, tortuous, purple, and decumbent stem, long and slender spines, and small flowers and capsules crowded in very short axillary racemes, readily distinguish it at a glance; according to Grisebach, the flowers are white.

7. H. MEGAPOTAMICA, *Spreng.*

Caulis ascendens, ramosus, molliter pubescens, pilis longis albis cum brevioribus intermixtis vestitus, inermis. *Folia* lanceolata, acuminata, circa 2 poll. longa, 6–7 lin. lata, breviter petiolata, utrinque tenuiter pubescentia, petiolorum venarumque pili longiores, haud glandulosi. *Flores* magni, 7–8 lin. lati, in cymas corymbosas foliosas dispositi, pedunculati; pedicelli floribus dimidio breviores, ut et rachis, pubescentes. *Sepala* lineari-lanceolata, 4–5 lin. longa, 1 lin. lata, extus pilosa, intus brevissime hirsuta, venosa. *Corolla* cærulea, calycem superans. *Ovarium* ellipticum, bi- vel triloculare. *Styli* duo vel tres, elongati. *Stigmata* capitata. *Capsula* elliptica, glabra, calyce persistente brevior.

Hydrolea megapotamica, *Spreng. Syst.* vol. iv. p. 114; *Chois. Descr. Hydrol.*; *DC. Prodr.*—Wigandia herbacea (?), *Chois. Descr. Hydrol.*; *DC. Prodr.* vol. x. p. 184.

This handsome species is easily distinguished from all the others belonging to Section B by its broad pubescent leaves and generally hairy habit. It is not, however, so easy to separate it from the unarmed variety of *H. spinosa,* to which it approaches very nearly, differing chiefly in its larger flowers, and, according to my observation, the hairs of the calyx and pedicels not being glandular, although so described by Choisy. It belongs to Southern Brazil, and is found in several collections. To this species I refer the specimens marked "prov. de Rio-Grande-do-Sul, M. Isabelle," and "in locis udis Porto-Segere," Tweedie, no. 162 in the Kew collection, as well as "Montevideo, Sello," and, doubtfully, "Surinam, Hostmann, no. 450" in the Vienna Herbarium.

8. H. GLABRA, *Schum.* (*non Chois., DC.*). (Tab. I. fig. 8.)

Caulis erectus, subsimplex, circa sesquipedalis, elegans, purpurascens, glaber, inermis, vel rarissime spinis perpaucis glabris armatus. *Folia* lineari-lanceolata, 15–20 lin. longa, 4–5 lin. lata, integra, utrinque attenuata, breviter petiolata, glaberrima, venâ mediâ subtus prominente. *Flores* pauci, parvi; cymæ laxæ, nudæ, vel foliis paucis præditæ, pedunlatæ; pedicelli et bracteæ glabræ. *Sepala* ovato-lanceolata, circa 2 lin. longa, acuta, basi vix coalita, venosa, glabra, vel pilis paucis rigidis prædita. *Petala* 2–3-linearia, cærulea, calyce vix longiora. *Ovarium* ovatum, glabrum, biloculare. *Styli* duo, divergentes, decidui. *Stigmata* capitata. *Capsula* orbicularis, glabra, bilocularis, calyce persistente paulo longior. *Semina* parva, longitudinaliter rugoso-striata.

Hydrolea glabra, *Schum. Guin.* p. 161.—H. guineensis, *Chois. Ann. Sc. Nat.* 1834, p. 180; *DC. Prodr.*—H. multiflora β. glabra, *DC. Prodr.*—H. zeylanica δ. glaberrima, *Chois. in Descr. Hydrol.*

This species might at first sight be taken for an unarmed form of *H. elegans*, but is readily distinguished by a certain difference in habit, arising from the inflorescence being much less leafy and the flowers decidedly smaller. This difference I find to be accompanied by a calyx shorter but more completely surrounding the ripe capsule, the sepals being of a decidedly different shape, ovate instead of lanceolate. The difference in the seeds, already spoken of, is also very marked. These characters serve to distinguish the species in those rare instances where the plant is furnished with a few scattered weak spines. Although, judging from the number of specimens in the continental herbaria, this is the most abundant species in Tropical America except *H. spinosa*, it appears to have been but imperfectly known to Prof. Choisy, who describes a specimen in Burchell's collection ("*Evolvulus*, no. 1365") clearly referable to this species (and its only representative in the Kew herbarium) in the first place, in his 'Description des Hydroléacées,' as a variety of *H. zeylanica*, and secondly, in De Candolle's 'Prodromus,' as a variety of *H. multiflora*, a plant to which it bears no resemblance. The species was first described by Schumacher in his 'Flora of Guinea' under the name of *H. glabra*, which name Choisy changed, without assigning any reason, to *H. guineensis*; hence arises considerable confusion in nomenclature. I have not, however, seen any African specimens. The Brazilian examples of it are marked:—"prope Rio de Janeiro et Tejucco," Pohl, in the Munich Herbarium; Schott, 5357, "Campo Vittorio," Sello, nos. 250, 333, 411, 5290, in the Berlin collection; and Burchell, 1365, in that of Kew. Sello's no. 938, from the Rio Negro, in the Berlin Herbarium, is possibly a distinct species, closely resembling *H. glabra*, but more hairy.

9. H. CORYMBOSA, *Elliot.*

Caulis ascendens, erectus, inermis, bipedalis, purpurascens, inferne simplex, glaber, superne ramosus; ramuli pubescentes. *Folia* lanceolata, sessilia, acuta, sæpe deflexa, glabra, vel brevissime pubescentia, 10–15 lin. longa, 3–4 lin. lata. *Flores* magni, terminales, corymbose aggregati; pedicelli brevissimi, hirsuti. *Sepala* lanceolata, acuta, hirsutissima, corollâ in alabastro breviora. *Corolla* insignis, cærulea, calyce triplo longior, extus hirsuta.

Hydrolea corymbosa, *Ell. Car.* vol. i. p. 336; *Chois. Descr. Hydrol.*; *DC. Prodr.*

Found in marshy swamps in Carolina, Georgia, and Florida. Very different in appearance from the preceding species, with large handsome blue flowers, three times as long as the calyx, arranged in corymbose heads, the leaves almost glabrous, sessile, lanceolate.

10. H. ZEYLANICA, *Vahl.* (Tab. I. figs. 9, 10.)

Caulis herbaceus, ascendens vel decumbens, fistulosus, subsimplex, glaber, striatus, nodis infimis radicans. *Folia* lanceolata, utrinque attenuata, acuta, 1–2 poll. longa, 4–6 lin. lata, glabra. *Flores* parvi, in racemos laxos foliosos axillares dispositi, pedunculati; pedicelli graciles, nunc bi- vel trilineares, apice incrassati, subglabri, nunc multo breviores, ut et apices ramulorum, glanduloso-pubescentes. *Sepala* linearia, acuta, 2–3-lin. longa, aut glabra, margine et nervo medio brevissime ciliata, aut glanduloso-pubescentia; in alabastro corollam multo superantia. *Corolla* cærulea, calyce paulo longior, petalis post anthesim reflexis. *Styli* duo, breves, recti, persistentes. *Stigmata* capitata. *Capsula* parva, 1½–2-linearis, ovata, glabra, sepalis persistentibus ¼ brevior.

Hydrolea zeylanica, *Vahl, Symb.* vol. ii. p. 46; *W. et Arn. in Hook.* vol. ii. p. 193, t. 26; *Wight, Ind. Bot.* t. 167; *Chois. Descr Hydrol.*; *DC. Prodr.*—H. javanica, *Blum. Beitr. Fl. Nederl. Ind.* p. 725.—Nama zeylanica, *Linn. Sp.* 327; *Fl. Zeyl.* 117, p. 49, t. 2.—Steris javana, *Linn. Mant.* p. 54 et p. 264.—Steris aquatica, *Burm. Ind.* 73, t. 39. f. 3.—Anagallis zeylanica, *Herm. Mus. Zeyl.* 36; *Burm. Zeyl.* 19.—Attalerie, *Poir. Enc. Suppl.* i. p. 535; *Pluk. Alm.* 22, t. 130, f. 2.—Hydrolea inermis (?), *Lour. Coch.* i. p. 214; *Chois. Descr. Hydrol.*; *DC. Prodr.*—Steris villosa (?), *Pav. MS. in herb. Deless.*

This species has been described under many synonyms, partly from its structure not having been accurately known (Linnæus having described it both as a *Nama* and a *Steris*), partly from the variability of the pubescence on the calyx and flower-stalks. This, however, does not appear to me sufficient ground for making even well-marked varieties, the specimens graduating from the sepals and pedicels being absolutely glabrous with the exception

of a minute ciliation of the former, to their being densely covered with a viscid glandular pubescence. In addition to its evidently aquatic habit, marked by the whorls of rootlets from the lower joints of its fistulose stem, sometimes extending to the whole length of its under surface, the species is distinguished by its linear sepals extending one-third beyond the corolla in the bud, and being much longer than the ripe capsules. The small flowers, with the petals reflexed, give the dried specimens a very Solanum-like appearance. There is a characteristic drawing in Wight's 'Indian Botany,' t. 167. The plant is of very general distribution throughout Tropical Asia and Africa, extending from the Philippine Islands, Java, Sumatra, Borneo, and Burmah, to Ceylon, Tranquibar, Nepaul, and the Punjaub. In Africa it is recorded from Congo, Senegal, the Niger, and Abeokuta. The glabrous form appears especially characteristic of Ceylon; and the African specimens are marked by the peculiarity of the racemes being much shorter, approaching in habit an unarmed form of *H. quadrivalvis.* I am inclined to include under this species the plant described by Loureiro in his 'Flora Cochinchinensis,' from Canton, as *H. inermis*, and which has been doubtfully retained as a distinct species by Choisy in his 'Description des Hydroléacées,' and in the 'Prodromus,' but appears to present no distinctive features. *H. zeylanica* has hitherto been described as confined to the Old World; but in the Kew Herbarium I find specimens gathered by Purdie " in moist places, Valle Durpar," Jamaica, and with white flowers from New Granada, and one from Guiana gathered by Schomburgk which I cannot dissociate from this species, although the flowers are somewhat smaller and the habit more diffuse. If these specimens are correctly referred, this species is the only one (with the doubtful exception of *H. glabra*) common to the two hemispheres.

11. H. MULTIFLORA, *Chois.* (Tab. I. fig. 11.)

Radix lignosa, fibrosa. *Caulis* suffruticosus, lignosus, decumbens vel patulus, vix pedem superans, tortuosus, ramosus, inermis, glaber vel mollissime puberulus; ramuli numerosi, erecto-patuli, apice glanduloso-villosi. *Folia* parva, linearia, 4–10 lin. longa, 1–2 lin. lata, glabra, petiolata, utrinque attenuata, integra. *Flores* parvi, conferti, in cymas numerosas laterales foliosas dispositi, pedunculati; pedicelli glanduloso-villosi. *Sepala* linearia, 1½–2 lin. longa, acuta, glanduloso-hirsuta, basi vix coalita. *Capsula* bilocularis, minima, orbicularis, bilinearis, glabra, membranacea. *Semina* permulta, minutissima, longitudinaliter striata.

Hydrolea multiflora, *Mart. MS.*; *Chois. Descr. Hydrol., DC. Prodr.*—H. zeylanica, var. γ (?), *Chois. Descr. Hydrol.*—H. elatior (?), *Schott in Spreng. Syst.* vol. v. p. 4, app. p. 404.—H. exaltata(?), *id. ex Steudel.*—Steris villosa, *Pav. MS. in herb. Deless.*

This species was gathered in Brazil by Martius, and is represented in the English and continental herbaria by that botanist's no. 1248, from Rio and Cujaba. Its apparently decumbent or spreading tortuous stem, linear leaves, small and crowded flowers, the sepals covered with a dense glandular viscid pubescence, and very small membranaceous capsules, distinguish it very clearly. Martius appears to have met with it only after the period of flowering, and I have seen no perfect flowers. It is remarkably brittle in the herbarium, and apparently grows in dry sandy places.

12. H. GRAMINIFOLIA, nov. sp. (Tab. I. fig. 12.)

Caulis ascendens, erectus, inferne radicans, glaber, teres, striatus, inferne maculate-purpurascens et simplex, superne ramosus, plus minus 4-pedalis. Folia linearia, graminiformia, glabra, 3-4 poll. longa, 2 lin. lata. *Flores* magni, cærulei, insignes, in paniculas densas foliosas corymbose dispositi, pedunculati. *Sepala* ovato-lanceolata, petalis in alabastro breviora, 2–3 lin. longa, ut et pedicellile vissime glanduloso-pubescentes. *Petala* azurea, glabra, sepalis duplo longiora. *Stamina* æqualia, basi spathulato-dilatata; filamenta elongata; antheræ dorsifixæ, sagittatæ, longitudinaliter dehiscentes. *Ovarium* orbiculare, glabrum. *Styli* duo, elongati, glabri, persistentes. *Stigmata* parva, capitata. *Capsula* parva, bilocularis, globosa, bilinearis, calyce persistente subbrevior, stylos persistentes apice gerens.

For this and the following new species of *Hydrolea*, collected by C. Barter, we are indebted to Baikie's Niger Expedition. It is described as growing "in swamps near Jeba, Nupe; 4 feet; flowers intense blue; one of the most beautiful of the swamp plants," which one can well believe, from its large flowers still retaining their deep blue hue, crowded in dense corymbose heads, its tall erect habit, and long, remarkably elegant grass-like leaves. I am only acquainted with specimens in the Kew Herbarium (no. 888).

13. H. MACROSEPALA, nov. sp. (Tab. I. fig. 13.)

Caulis ascendens, erectus, inferne radicans, glaber, teres, striatus, inferne simplex, superne ramosus; ramuli graciles, patuli. *Folia* linearia, glabra, 2 poll. longa, 3–4 lin. lata. *Flores* cærulei, in paniculas laxas dispositi, pedunculati; pedicelli longi, 3–6-lineares, glabri. *Sepala* magna, triangularia, subcordata, acuta, 3–4 lin. longa, 3 lin. lata, glaberrima, reticulato-venosa. *Corolla* parva, glabra. *Ovarium* minutum, glabrum. *Styli* duo, decidui. *Capsula* bilocularis, parva, glabra, globosa, bilinearis, in calyce persistente inclusa, eoque dimidio brevior.

From swamps, Nupe. Though only represented by two specimens in the Kew Herbarium, I have no hesitation in describing this as a distinct species from the last. The very large, triangular, conspicuously-veined sepals, completely enclosing the ripe capsule, at once serve to distinguish it, combined with the inflorescence being much laxer, more diffuse, and not corymbose, the flowers smaller on longer pedicels, and the leaves shorter and somewhat broader. The deciduous styles may also possibly furnish another character.

To complete this review of the genus *Hydrolea,* and to facilitate a comparison with the descriptions of those who have worked at it before, I append a list of excluded species and synonyms.

H. montevidensis, *Chois., DC. Prodr.* x. 181, "Species dubia, ad Montevideo, Sello. Reichelia montevidensis, *Spreng. Syst.* vol. i. p. 940."

The description is exceedingly imperfect; and the two characters of opposite leaves and solitary flowers would seem to remove it altogether from this genus.

H. guineensis, *Chois., DC. Prodr.*; H. multiflora β. glabra, *DC. Prodr.*; H. zeylanica δ. glaberrima, *Chois. Descr. Hydrol.*=H. glabra, *Schum.*

H. glabra, *Chois., DC. Prodr., herb. Brit. Mus. MS.*; H. spinosa, var. glabra, *Mart. MS. in herb.*=H. elegans, *nob.*

H. trigyna, *Sw. Cavan.*=varietas H. spinosæ, *Linn.*

H. zeylanica γ, *Chois. Descr. Hydrol.*; H. elatior, *Schott* (?); H. exaltata, *Schott* (?).=H. multiflora, *Chois.*

H. inermis, *Lour., Chois., DC. Prodr.* (?); H. javanica, *Blum.*=H. zeylanica, *Vahl.*

H. caroliniana, *Michx.*=H. quadrivalvis, *Walt.*

H. Bartramii, *herb. Brit. Mus. MS.* (?); H. palustris, *Ræusch* (?).=H. quadrivalvis, β. inermis, *Walt.*

H. diffusa, *Ræusch,* capensis; H. verticillata, *Raf. ex Steud.,* americana; species non satis notæ vel dubiæ.

H. urens, *R. et Pav.*=Wigandia urens, *Chois.*

H. auriculata, *Moc. ined.*=Wigandia Kunthii, *Chois.*

H. congesta, *Willd.*; H. radians, *Moc. ined.*; H. rupincola, *Moc. ined.*=Nama undulata, *H., B. et K.*

H. crispa, *Pav.*=Wigandia crispa, *H., B. et K.*

H. decurrens, *Moc. ined.*; H. jamaicensis, *Ræusch.*=Nama jamaicensis, *Linn.*

H. dichotoma, *Pav.*=Nama dichotoma, *Chois.*

H. mollis, *Willd.* = Wigandia caracasana, *H., B. et K.*
H. scorpioides, *Moc. ined.* = Wigandia scorpioides, *Chois.*
H. tenella, *Moc. ined.* = Nama origanifolia, *H., B. et K.*
H. violacea, *Moc. ined.* = Nama longiflora. *Chois.*

EXPLICATIO TABULÆ I.

Fig. 1. *Hydrolea spinosa* (Linn.). Ovarium et styli.
2. „ „ Sepala, capsula et styli (var. *trigyna*).
3. „ „ Corolla et stamina.
4. „ „ Semen.
5. „ *elegans* (nob.). Sepala, capsula, et styli.
6. „ „ Semen.
7. „ *nigricaulis*, Griseb. Sepala et capsula.
8. „ *glabra* (Schum.). Sepala et capsula.
9. „ *zeylanica* (Vahl). Sepala et alabastrum (forma glabrior).
10. „ „ Sepala, capsula et styli (forma glandulosior).
11. „ *multiflora* (Chois.). Sepala et capsula.
12. „ *graminifolia* (nob.). Sepala et alabastrum.
13. „ *macrosepala* (nob.). Sepala circa fructum persistentia.

On a Species of *Ipomœa*, affording Tampico Jalap.

By Daniel Hanbury, Esq., F.R.S., F.L.S.

(Plate II.)

[Read December 16, 1869.]

Two centuries and a half have elapsed since Jalap, the tubercule of a convolvulaceous plant of Mexico, was introduced into the Materia Medica of Europe. The botanical origin of the drug long remained unsettled, evidence of which exists in the fact that two plants, neither of which yields jalap, have in succession received, and still retain, the specific name *Jalapa*. The veritable source of jalap, however, was brought to light between the years 1827 and 1830, in which latter the plant was described by Wenderoth as *Convolvulus Purga*. In 1833 it was figured by Hayne under the name of *Ipomœa Purga*; but in 1839 it was transferred, on account of its tubular corolla and exsert stamens, to Choisy's genus *Exogonium*. As this genus has been recently united to *Ipomœa* by Dr. Meisner, it appears best to return to the name proposed by Hayne, and to call the true jalap-plant *Ipomœa Purga*.

The unsettled condition of Mexico, and the fluctuations of commerce, have alternately depreciated or enhanced the value of jalap, and have led to the occasional importation of other roots possessing more or less of the characters of the true drug. Of such kinds of jalap, one of the most remarkable is a tubercule imported a few years ago for the first time from Tampico, and thence called *Tampico Jalap**. This drug has been extensively brought into the market (that is to say, by hundreds of bales); and though it is less rich in resin and less purgative than true jalap, yet, on account of its lower price, it has found a ready sale, chiefly in continental trade.

As the botanical origin of this so-called Tampico Jalap, and even its place of growth, were completely unknown, I addressed a letter, in November 1867, to my friend Hugo Finck, Esq., Prussian Vice-Consul at Cordova (Mexico), begging that he would, if possible, procure for me some information on the subject. Mr. Finck at first expressed strong doubts as to Tampico jalap being any thing else than the root of *Batatas Jalapa*, Chois., known in Mexico as *Purga macho*. Upon inquiry, however, he ascertained that such could not be the case, but that it is a production of the State of Guanajuato, where it grows along the Sierra Gorda, in the neighbourhood of San Luis de la Paz. At this town and in the adjacent villages, it is purchased of the Indians and carried by the muleteers to Tampico, where it is known as *Purga de Sierra Gorda*.

All attempts to procure specimens of the plant were for some time fruitless, chiefly owing to the difficulty of finding any one in the district who could be induced to take the needful trouble. The perseverance of Mr. Finck and his friend Mr. E. Benecke, Consul General for Prussia in the city of Mexico, overcame at length this obstacle, but only to meet with others hardly less embarrassing. The first lot of specimens dispatched from Guanajuato was stolen from the mail; the second shared the same fate; while a third, which included live tubercules, was, by successive detentions on the way, fully five months in reaching England. The box, however, came to hand in June last; and amid a mass of damp earth and decaying matter, I had the satisfaction of discovering one solitary tubercule exhibiting signs of vitality. This, placed in a greenhouse and carefully nursed, soon began to grow with rapidity, and, on removal to an open border, produced a tall and vigorous plant, which towards September showed signs of flowering. It was then taken up and replaced in the greenhouse, where it blossomed freely in October last, but did not mature any seeds. Accompanying the tubercules, but of course in a separate box, my correspondent sent some pressed and dried specimens from Guanajuato, which corresponded perfectly with the growing plant.

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* I cannot, at least, trace this jalap to have been offered in commerce as a distinct sort earlier than about five or six years ago.

Having ascertained, from the study of these materials, that the plant belonged to the genus *Ipomœa*, I endeavoured to identify it with some species described in the 'Prodromus' of De Candolle, or in the subsequently published 'Annales' of Walpers, but without success. Neither was I able to find any corresponding specimen in the herbaria of the British Museum or of the Royal Gardens of Kew. In the Paris Museum there is a plant, collected by Galeotti on the lofty Cordillera near Oaxaca, which, so far as a scanty specimen enables me to judge, accords precisely with that received from Mr. Finck. It bears a number which is not mentioned in the enumeration, by Martens, of Galeotti's *Convolvulaceæ* (contained in the 'Bulletin de l'Académie Royale de Bruxelles'*); and I therefore conclude that it is unnamed. Under these circumstances, I have drawn up the following diagnosis and description of the plant, which I propose to call *Ipomœa simulans*. The specific name is chosen in allusion to the remarkable similarity which the plant bears in foliage and habit to the true jalap (*Ipomœa Purga*, Hayne), not to mention the resemblance of its tubercules. The funnel-shaped corolla and pendent flower-buds of the Tampico jalap-plant are quite unlike the corresponding parts of *I. Purga*, and furnish a ready means of distinguishing the two species :—

IPOMŒA SIMULANS, sp. nov. Radice tuberosâ, caule volubili herbaceo glabro, foliis ovatis, acuminatis, cordatis v. sagittatis, indivisis, pedunculis unifloris solitariis, sepalis parvis.

Hab. in Andibus Mexicanis *Sierra Gorda* dictis, prov. Guanajuato (fide cl. *Finck*); in regione frigidâ ad ped. 8000 propè Oaxaca (*H. Galeotti*, no. 1369!).

Radix napiformis v. subglobosa v. elongata, carnosa, 2–3 poll. longa, basi fibrillosa. *Caules* herbacei, graciles. *Folia* glaberrima, 2–4-pollicaria, 1–2 poll. lata, lobis baseos acutis v. rotundatis v. subtruncatis, petiolo tenui, 1¼–2¼-pollicari. *Pedunculi* axillares, petiolum subæquantes, penduli, uniflori v. in plantâ vegetiore novelli alabrastra duo ferentes, altero semper (ut videtur) abortivo. *Pedicelli* incrassati, basi bracteis 2 minutis. *Sepala* ovata, obtusa, exteriora paullulum breviora. *Corolla* infundibuliformis, 1½–2 poll. longa, glabra, rosea, pallidè striata. *Stigma* bilobum. *Capsula* calycem superans, conica, 2-locularis, valvis 4 coriaceis. *Semina* glabra.

TAB. II. fig. 1, Calyx and pistil; 2, Ovary; 3, Mature capsule: *all magnified.*

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* Tome xii. pt. 2 (1845), p. 257.

A Revision of the Flora of Iceland. By CHARLES CARDALE BABINGTON, M.A., F.R. & L.SS., Professor of Botany in the University of Cambridge.

[Read January 20, 1870.]

THE following paper relates to the Phanerogamic flora of the large island of Iceland, which is situated in the Northern Ocean, at about 600 miles to the west of Norway, about as far to the north of Scotland, and not more than 60 miles from the ice-bound coast of Greenland. In size it is somewhat larger than Ireland, containing about 40,000 square miles. One of its two northern capes extends slightly to the north of the Arctic Circle; and the other very nearly approaches that latitude. The extreme length from east to west is about 180 miles, and breadth from north to south somewhat more than 100 miles. It is wholly of volcanic structure; and the surface consists of beds of ancient and modern lava, basaltic rock, very extensive morasses, numerous lakes, and large tracts consisting of volcanic sand. Much also of the country is occupied by mountains, many of which rise to the height of 6000 feet, and are covered through fully their upper half with perpetual ice and snow, from whence extensive glaciers descend almost to the level of the sea. Notwithstanding its northern situation, the climate of the country is rendered comparatively mild by the action of the Gulf Stream, which washes the coast, and often, as I am informed by Prof. A. Newton, deposits West-Indian productions on the western shore. The presence of this warm current also causes the rain-fall to be very great, and the summer sky to be often covered with clouds. There is therefore a deficiency of that direct sunlight which is required by many plants for their perfect development; and its absence is probably the cause of no forests like those of Norway existing now, or apparently at any previous date—also of the climate being unfit for the growth of grain and of most of the products of gardens, which are found even in Norway.

It seems probable that at an early period, even since the island was settled by the Northmen in A.D. 874, there were many more trees than are now to be found; but of this there is no certainty, and it may be considered quite certain that no forests of Pine-trees ever existed. What the inhabitants call "forests" may now be found—the wood at Thingvellir for instance; but they are only tracts covered with low bushes of

Birch and Willow, about 10 or, possibly, 12 feet in height. The remains of Birch-trees (*B. glutinosa*, Fr.), which are said to have been 12 feet or more in height, and had trunks at least 2 feet in thickness, are to be found in several places. They formed woods extending for several miles along the valleys where they grew. (See *Betula glutinosa* in the following Flora.) My friend Mr. E. Magnüsson, a native of the eastern part of Iceland, informs me that these valuable woods, which were destroyed by the carelessness of the inhabitants, are likely to be restored by natural growth now that attention is paid to them.

The chief product of the country is hay, without which the horses, cows, and sheep could not be kept alive in the winter; the extensive boggy meadows produce excellent hay, although the still more extensive bogs are unproductive.

Arterial drainage would, I believe, have the effect of much extending the available pasture-land, and thus adding to the prosperity of the country, which depends so much upon the live stock which can be kept through the winter.

Owing to the presence of an enormous mass of icy mountains (Jokuls) near the south coast, the northern parts of Iceland are the more productive portions of the island. I am informed that there large crops of excellent potatos are raised, more hay is made, and there is more garden-culture than exists in the neighbourhood of Reykjavik and in other south-western districts.

The vegetation is essentially European; only 62 species are found which do not form part of the British flora. Of these a list is given, pointing out the other countries in which they grow. Nearly all the species inhabit Scandinavia; and not more than three are decidedly arctic, viz. *Gentiana detonsa, Pleurogyne rotata*, and *Epilobium latifolium*. This want of truly Arctic species may be partly caused by the Gulf Stream diverting the Arctic current from the Icelandic shores.

It might perhaps be supposed that the flora of Iceland had received so much attention during the last hundred years that no further research was wanted, and no additional publication concerning it desirable. But, my attention having been directed to the subject by becoming possessed of a considerable number of Icelandic plants, I have found that much doubt still exists as to the presence in the island, or absence from it, of many species. The most recently published lists of the flora are not more, even if quite as, satisfactory as the older ones. It therefore seems desirable to draw up a revised list, derived from all the sources of information now easily accessible. Fortunately I have been able to examine nearly all the books (some of them very rare) which treat of the flora of Iceland either expressly or incidentally—a greater number, apparently, than was accessible to any former compiler. Unfortunately, very few of the systematic lists take any notice of the localities of the plants they enumerate. This is the case with the only separate Flora of Iceland (Hjaltalin's 'Islenzk Grasafrædi'). I have therefore collected together as many localities as possible, and in every case marked (!) those of them whence I have seen specimens, except where my own authority is given.

The following is as complete an account of the authorities upon which the Flora depends as I have been able to prepare. It is true that Dr. Lauder Lindsay gives a longer list of writers, with many of whose works he is unacquainted; but in a few cases the titles of the books are repetitions, and in others the works seem to be of little value or consequence. He also enumerates such books as Ida Pfeiffer's 'Journal' and Henderson's 'Journal,' in which there are a few incidental notices of plants. One book, Palson's 'Grasafrædi,' written about 1800, may be valuable, as is the opinion of Dr. Lindsay; but neither he nor I have been able to find a copy of it in accessible libraries. The "List of Icelandic Plants, with their Linnean names," by Olaf Olafsen, contained in the 'Transactions' of the first Literary Society of Iceland (Rit pesz Islenska Laerdöms, i. 1–10), is simply a list of Linnæan and Icelandic names of plants; in vol. viii. (pp. 193–212) of the same series is "A Paper on the Grasses and Grass-like Plants," by the same author; the List was published in 1781, the Paper in 1788.

Müller published the first Flora of Iceland in the 'Nova Acta Acad. C. L. C. Nat. Curiosorum' (vol. iv. pp. 203–215), in the year 1770. It is not the result of his own researches, but derived from the manuscripts of J. G. König, M.D., who collected the plants enumerated in the years 1764 and 1765, but was prevented from publishing the list by his departure for India, where he settled as a medical practitioner at Tranquebar. It is entitled "Enumeratio stirpium in Islandia sponte crescentium." It is sometimes quoted as Müller's, but more correctly as König's Flora. This is the foundation of the Flora of Iceland.

The next list is founded upon that of König. It is the "Flora Islandica" of Johan Zoega, which first appeared in 'Olafsen og Povelsen Reise igienem Island" (Soroe, 1772), and in the German translation entitled 'Olaf. und Povel. Reise durch Island' (Copenhagen 1775), also, without the synonyms and the few descriptions, in 'Troil's Bref om Island.' It contains much new matter. The Danish original does not differ materially from the German translation, except by being more carefully printed and containing one species of plant (*Angelica sylvestris*) which was accidentally omitted in the latter. There is also a French translalation of this work, or rather a book intended to convey the substance of the contents of the original: the part relating to the reformation in religion is omitted; and it does not contain Zoega's Flora. There is also a very much abridged translation into English in 'A Collection of modern and contemporary Voyages and Travels,' vol. ii. (London, 1805), which I have not seen, and concerning which I have no information.

In the same year (1772) Dr. Dan. Solander accompanied Sir Joseph Banks to Iceland, where he collected plants. A considerable number of these specimens are preserved in the British Museum, perhaps all of them. He made a catalogue of the plants observed in Iceland by the party, and in many cases noted their localities. This catalogue is kept in the botanical department of the British Museum, and is entitled 'Flora Islandica;' it seems to contain the names of some plants not gathered during the journey of Sir J. Banks, but derived from the Floras of König and Zoega. It is a very valuable list. The Journal of Sir J. Banks's travels has not been published, and is inaccessible.

N. Mohr's 'Forsog til in Islandsk Naturhistorie' (Copenhagen, 1786) contains a complete list of the plants known to grow there at the time of its publication. It appears to be chiefly the result of his own researches.

Hooker's well-known "List," appended to Mackenzie's 'Travels in Iceland' and to his own 'Tour in Iceland,' was published in 1811. It is chiefly derived from the old catalogues, but contains a few interesting additions made by himself. Some of the latter may admit of doubt, being recorded from memory alone; for his collections were destroyed by fire.

Drs. Thienemann and Günther travelled through the northeastern part and along the east and south coasts in 1820–21. They notice many of the plants observed on their route, and especially record that they saw the rose-bushes at Seljaland. The book is entitled 'Reise im Norden Europas, vorzüglich in Island,' and was published at Leipzig in 1827. It does not contain a regular catalogue of the plants, but occasional notices; neither is there any index.

F. Gliemann's 'Geographische Beschreibung von Island,' published at Altona in 1824, is the next book which contains a catalogue of the plants. It is the fullest list that we possess, if number of names is to be the criterion; but the many repetitions and mistakes in it show that it is not deserving of much confidence. If drawn up by a botanist, it was very carelessly done, and with the intention of swelling the list to the utmost. Mörck, who travelled in Iceland in 1820, is constantly quoted as an authority for plants by Gliemann. Prof. Joh. Lange has sent me the names of a considerable number of specimens collected by Mörck, which are preserved in the Herb. Hornemann at Copenhagen.

Hjaltalin's 'Islenzk Grasafraedi,' published at Copenhagen in 1830, next occurs. It is a very rare book; but a copy will be found in the British Museum. It is written in the Icelandic language, and contains a complete Flora of Iceland and an introduction to botany. It gives short descriptions of the plants, remarks upon their uses, but apparently no exact localities. In it the plants are arranged according to the Linnean system; Icelandic names stand first, and after them the scientific names. The Icelandic names are manifestly often only translations of the Latin names, not vernacular terms; nevertheless many of the true native names are also given. This book is a most admirable contribution to our knowledge of the flora of the island, and seems to be the result of much care and study.

Between the years 1835 and 1840 MM. Vahl and Robert drew up and published an account of the plants obtained during the voyage of the French ship 'La Recherche.' The list was made by Vahl, and is entitled 'Liste des plantes que l'on suppose exister en Islande.' The author marks those plants which he knew to grow there, and adds many others of doubtful nativity—many of them very doubtful indeed, as it appears to me.

My short list of the plants actually gathered by myself in 1846 was published in the 'Annals of Natural History' for 1847 (ser. i. vol. xx. p. 30) and Trans. of Bot. Soc. Edin. (vol. iii. p. 15).

In 1860 M. Benguerel observed a considerable number of plants in Iceland. He has published a list of them in the 'Bull. de la

Soc. des Sc. Nat. de Neuchatel' (vol. v. p. 449). He was chiefly occupied with the study of ornithology, and I fear that but little confidence can be placed in his list of plants.

In 1861 Dr. W. Lauder Lindsay drew up his "Flora of Iceland," and published it in the 'Edinb. New Philos. Journal' of that year. He did not gather many phanerogamous plants, on account of his attention being chiefly devoted to the cryptogamic products of the island, and has founded his list of the former upon the works of his predecessors. Unfortunately he omitted to mark the plants resting upon his own authority, but has most kindly presented all his specimens to my herbarium; and their localities are recorded in my list.

At almost exactly the same time MM. Preyer and Zirkel printed a list of plants in their 'Reise nach Island.' They include a great many of Vahl's "possible" plants, and do not inform us of their authority for doing so, but seem, in some cases, to have followed Lindsay's list, of which they had a copy at the time when their book was being printed. They also give a catalogue of useful and ornamental plants noticed by them in their rather extended tour from Reykjavik to the Geysirs, the river Thjorsa near Hekla, Myvatn, and through the northern districts to Hrutafjord, and back by Kalmannstunga to Reykjavik.

In the summer of 1861, Mr. E. T. Holland made a very long tour round the southern, eastern, and much of the northern coasts. Of this an account will be found in the 'Peaks, Passes, and Glaciers' of the Alpine Club (ser. 2, ed. Kennedy). To that account I appended a catalogue of the plants gathered by him. He does not profess to be a botanist, but made his valuable collection at my request.

In the same summer of 1861, Mr. Isaac Carroll, a well-known botanist, resident at Cork, visited part of the north coast about Akreyri, and also the Geysirs. He kindly submitted his plants to my examination; and the result is incorporated in this catalogue.

In August, 1862, Dr. A. Leared visited Iceland and obtained some plants. He is not a botanist, but picked up such specimens as attracted his attention in the south-western part of the country. He also allowed me to catalogue his plants, and to incorporate the information derived from them with that which I already possessed. He obtained a few specimens from two young Icelandic botanists, MM. Gisleason and Gudmundson the names of which I have incorporated in the list. The only plant added to the flora by Dr. Leared is *Blechnum boreale.* Dr. Leared usually did not take note of the exact place where his specimens were gathered; and I have therefore in this, as in some other cases, been obliged to insert the plants as simply from Iceland. As such they and some few other specimens which I have seen, are proofs of the plants growing in Iceland, and thus are of considerable value, although of less than they might have been if a note of their localities had been made.

Mr. A. J. Symington gathered a few plants between Reykjavik and the Geysirs, and also obtained some from the north-east coast, especially near Seythisfjord. Unfortunately he got very few from the latter place, where no plants seem to have been previously gathered.

The Rev. S. Baring-Gould made a long tour through the northern parts of Iceland in 1862. Botany was not his object, and he unfortunately lost most of the plants which he collected. He appended to his book upon Iceland a list of phanerogamous plants and ferns: with the exception of the names of the plants gathered by himself, it is avowedly a compilation from preceding authors, and includes all the errors introduced by them.

Recently, my valued friend Prof. Joh. Lange, of Copenhagen, has extracted for me, from the herbaria preserved in that city, the names of the Icelandic plants and the localities of all those that are exactly localized in the island. They consist of the plants of Mörck, now in Hornemann's herbarium, those of the celebrated Prof. Steenstrup, collected in 1840 and 1841, and those of Dr. Krabbe, gathered in 1863. I take this opportunity of publicly thanking him for the very great trouble that he has taken to assist me in making my catalogue as complete as possible.

In the catalogue, the capital letter placed in the same line as the scientific name of the plant is the initial of the author by whom the species was first recorded as a native of Iceland. The initial letter of the name of the authority for each locality is appended to it, in order to save the space which would have been occupied by giving the name at full length. The following are the contractions employed:—

Alphabetical List of Authorities and the Contractions under which they are quoted, and their Dates.

B.	Babington, 1848.	*Ld.*	Leared, 1862.
Bl.	Benguerel, 1860.	*M.*	Mohr, 1786.
B. G.	Baring-Gould, 1863.	*Mk.*	Mörck.
C.	Carroll, 1861.	*P. & Z.*	Preyer and Zirkel, 1861.
G.	Gliemann, 1824.	*S.*	Solander, 1772.
H.	Hooker, 1811.	*St.*	Steenstrup, 1840-41.
Hd.	Holland, 1862.	*Sy.*	Symington, 1863.
Hj.	Hjaltalin, 1830.	*T. & G.*	Thienemann and Günther, 1827.
K.	König and Müller, 1770.		
Kr.	Krabbe.	*V.*	Vahl, 1840.
L.	Lindsay, 1861.	*Z.*	Zoega, 1772.

List of Icelandic Plants not natives of Britain.

Ranunculus glacialis. Alpine and Scandinavian.
R. nivalis. Scandinavian and Arctic.
R. lapponicus. Scandinavian and Arctic.
R. hyperboreus. Scandinavian and Arctic.
R. pygmæus. Scandinavian and Arctic.
R. polyanthemos. Europæan.
Papaver alpinum. Europæan.
Arabis alpina. Alpine and Scandinavian.
Cardamine bellidifolia. Scandinavian.
Erysimum alpinum. Scandinavian.
Draba muralis. Alpine and Scandinavian.
D. hirta. Scandinavian.
D. nivalis. Scandinavian.
Arenaria arctica. Arctic and Alpine.
Stellaria crassifolia. Europæan.
S. borealis. Scandinavian.
Epilobium latifolium. Arctic.
Sedum villosum. Europæan.
S. annuum. Europæan.
Bulliardia aquatica. Europæan.
Saxifraga Cotyledon. Alpine and Scandinavian.
S. Aizoon. Alpine and Scandinavian.
S. petræa. South-east of Europe.
Crepis præmorsa. Europæan.
Hieracium floribundum. Europæan.
H. Auricula. Europæan.

Andromeda hypnoides. Scandinavian.
Rhododendron lapponicum. Arctic and Lapland.
Ledum palustre. Europæan and Arctic.
Gentiana detonsa. Arctic.
G. involucrata. Arctic and Lapland.
G. tenella. Arctic and Lapland.
Pleurogyne rotata. Arctic.
Diapensia lapponica. Arctic and Lapland.
Myosotis stricta. Europæan.
Pedicularis Œderi. Scandinavian.
Primula stricta. Scandinavian.
Atriplex hortensis. Scandinavian.
Kœnigia islandica. Arctic and Lapland.
Betula intermedia. Europæan.
Salix myrtilloides. Arctic and Lapland.
S. ovata. Europæan.
S. arctica. Arctic.
S. pyrenaica, var. Arctic.
Orchis cruenta. Arctic and Lapland.
Platanthera hyperborea. Arctic.
Nigritella nigra. Europæan.
Juncus alpinus. Europæan.
Luzula confusa. —— ?
Eriophorum Scheuchzeri. Scandinavian.
Carex capitata. Europæan.
C. norvegica. Scandinavian.
C. cryptocarpa. Arctic and Lapland.
C. hyperborea. Arctic and Lapland.
C. anguillata. Arctic and Lapland.
C. pedata. Scandinavian.
C. fuliginosa. Europæan.
Calamagrostis varia. —— ?
Agrostis rubra. Arctic and Lapland.
Aira atropurpurea. Scandinavian.
Trisetum subspicatum. Europæan.
Lycopodium complanatum. Europæan.

I trust that excuse will be made for any mistake in the spelling of the names of places mentioned in this Flora. It is caused by the great difficulty that in many cases exists in discovering the correct mode of spelling them.

FLORA OF ICELAND.

1. **Thalictrum alpinum**, *Linn.—K.*
Reykjavik, *B.* Hafnarfjord, *S.*! Vatusdalr, Skjalfanda, *B.G.* Oefjord, *M.* Akreyri, *Hd.* Seythisfjord, *Sy.* Kiebleviig, *Z.* Myvatn, *T. & G.*

2. **Ranunculus aquatilis**, *Linn.—K.*
Reykjavik, in a pool of fresh water at about a mile to the west of the town, *B.* Vatusdalr, *B. G.* Seythisfjord, *Sy.* Esia, *Mk.*

I have not seen Baring-Gould's plant. Mine is very much like *R. confervoides* (Fr.); but that plant has smaller flowers and smoother and blunter carpels, which want the persistent base of the style that is found on my plant. Prof. Lange refers the specimens gathered by Mörck and Krabbe to the *R. Drouetii* (Schultz), which differs from my plant by its greener leaves, capsules inflated at the end, and much shorter uniformly thick peduncles. My plant may be characterized as follows:—

R. foliis omnibus submersis petiolatis repetite trichotomis, petalis obovato-oblongis 5–7-venosis calyce longioribus, staminibus ovariorum capitula excedentibus, carpellis ½-obovatis apice obtuso compresso sublateraliter apiculato. *Folia* eburneo-viridia. *Stipula* longe adnata vix auriculata. *Alabaster* oblongus.

3. **R. hederaceus**, *Linn.—K.*
Vithimyri, *B. G.*

4. **R. glacialis**, *Linn.—K.*
Mountains above Akreyri, *C.*! Mountain between Stadarbraun and Holbeinstadr, *Sir J. Mackenzie, H.* Zrekyllis Heidi and Reykjarfjord, *G.* Near Holmar by Reydarfjord, and at Lonsheidi near Stafafell, *T. & G.* Blaakulla and Thorgelshorne, *M.* Thorisengismule, *S.* Hnausir in Hunavatn Syssel, *K.*

Robert found it near the top of Stafsheithi, near Holmar, in beautiful flower on the 25th of July, when the temperature of the air was below, but of the soil rather above, the freezing-point.

5. **R. reptans**, *Linn.—K.*
Lagarfljot, *G.* In the tun at Thingvellir, *B. G.*! Reykjavik and Seythisfjord, *Sy.* Reykholt, *St.*

Baring-Gould records *R. Flammula*; but his specimens and written information showed that he really gathered *R. reptans.* The authority which he followed considered them to be forms of one species. Apparently that idea has arisen from small states of *R. Flammula* being mistaken for the *R. reptans.* The plants seem to be abundantly distinct. Good figures of *R. reptans* will be found in the titlepage of Sibthorp's 'Flora Scotica,' in Sturm's 'Deutschlands Flora' (82–84), and Syme's 'English Botany' (tab. 30).

6. R. NIVALIS, *Linn.*—*K.*
Esia near Reykjavik, *Mk.*

Henderson quotes from Svend Paulsen's MS. that that botanist had found this species at the edge of the perpetual snow on the ascent of Oraefa Jokul from Quisker [Kvisker] at the eastern side of the mountain. As Paulsen was an excellent botanist, it is probable that he found the true plant. He adds that it is very rarely to be met with on the southern Alps of Iceland. Mohr states that it grows by the way from Trekyllisheidi to Reykefjord.

7. R. LAPPONICUS, *Linn.*—*K.*
By Ness, *Z.* Between Haukadal church and Laugafjall, in the morass, abundantly, *H.*

Gliemann suspected that what Hooker found was the *R. pygmæus* (Wahl.), but apparently without much reason. T. & G. say that *R. montanus* grows at Eydar on the Lagarfljot. Did they find *R. lapponicus* or *R. nivalis*?

8. R. HYPERBOREUS, *Rottb.*—*K.*
Reykjavik (with *R. aquatilis*), *B.* Bessested, Œrebak, Hofsaa, Adner See, *Z.* Hrutefjord, *G.* Hafnarfjord, *S.*! Myvatn, *T. & G.* Reykholar, Hredavatn, Olafrdal, Hollafjordsheidi, *S.*
This is the *R. Ammannii* (Kön.) of Fl. Dan. t. 331.

9. R. PYGMÆUS, *Sol.*—*P. & Z.*
On the mountains above Akreyri, at an elevation of about 3000 feet, *C.* Holar, *B. G.* Skagafjord, *Sy.*

10. R. ACRIS, *Linn.*—*K.*
R. sylvaticus, *Fr.* (not *Thuill.*). R. Friesianus (*Jord.*).
Reykjavik, Reinevallahals, *B.* Geysirs, *C.*! Between Reyniveller and Holker, *Hd.* Hafnarfjord, *S.*! Seidisfjord, *Sy.*! Skagafjord, *Sy.* Hredavatn, *St.*

11. R. POLYANTHEMOS, *Linn.*—*G.*
Eydar on the Lagarfljot, *T. & G.*

12. R. REPENS, *Linn.*—*K.*
Geysirs, *B.* Reykjavik, *Mk.* Eydar on the Lagarfljot, *T. & G.*

13. CALTHA PALUSTRIS, *Linn.*—*K.*
Reykjavik and Thingvellir, *B.*! Seidisfjord and Skagafjord, *Sy.*

This is apparently a common plant in Iceland, but has not been found in Greenland or Spitzbergen.

[*Berberis vulgaris*, Linn., is recorded by G., but is not likely to be a native.]

14. **Papaver alpinum,** *Linn.—K.*

Jokaldalr near Stafafell, and near Leera by Borgarfjord, *Hd.*! Akreyri, *C.*! Garpsdal, Thorisengismule, and Breidabolstad, *St.* Stranda Syssel, *G.* Kollafjord, *M.* Hrutafjord, *B. G.* Near Holmar on Reydarfjord, *T. & G.*

Preyer and Zirkel also record *P. alpinum* (Linn.), which is probably not distinct from *P. nudicaule.* Mohr and also Gliemann give *P. radiatum*, which is another synonym of *P. nudicaule.* Solander mentions doubtfully *P. dubium* on the authority of Paulsen's Herbarium.

[*Nasturtium officinale* (R. Br.) is in Lindsay's 'Flora,' but in no other list. I much doubt its correctness.]

15. **Nasturtium palustre,** *DC.—K.*

Sisymbrium islandicum, *Fl. Dan.* 409.
S. terrestre, *Hooker.*
S. palustre, var. islandicum, *Hj.*
S. sylvestre, *Mohr.*

By hot springs and in wet places about Krafle and Myvatn, *Z.* and also G.

Dr. Lindsay places the *N. amphibium* (R. Br.) as a synonym of this species, and P. & Z. follow him. There must be some mistake or misprint. Hjaltalin has *N. amphibium*, var. *terrestre*, which may be the *N. amphibium*, but is more probably the present plant.

16. **Arabis alpina,** *Linn.—K.*

Reinevallahals, *B.* Above Eyjafjord, *C.*! Sweinascaur, *H.* Siglufjord, *T. & G.* Thingvellir and Esia, *St.* Oxnedalrheidi, *Kr.* Skagafjord, *Sy.*!

Brassica alpina, which is not different from this plant, is also recorded by Gliemann.

[*Sinapis arvensis* is considered a native by Gliemann.]

17. **A. petræa,** *Linn.—K.*

Cardamine faeroensis (*G.*).
C. petræa (*G.*).

Reykjavik, *B.* Eyjafjord, *C.*! Hafnarfjord, *L.*! Geysirs, *Hd.* Vithivik in Skagafjord, *B. G.* Sletta, *St.* Seythisfjord, *Sy.*

β. *hispida* is occasionally found, *Mk.*

18. **Cardamine bellidifolia**, *Linn.—K.*

There is a specimen from Iceland, but without any exact locality, in the herbarium at Copenhagen, which was gathered by Steenstrup.

The *Erysimum alpinum* of H., P. & Z., and L., is probably the same plant.

19. **C. hirsuta**, *Linn.—K.*

Reykjavik, *B.*

This is the true *C. hirsuta.* I have not seen a specimen of *C. sylvatica* from Iceland; but Dr. Lindsay includes it in his 'Flora.'

C. intermedia (Horn.) is *C. hirsuta*, which is probably the plant intended by Vahl, although he also enumerates *C. hirsuta* separately; Gliemann does the same.

20. **C. pratensis**, *Linn.—K.*

Reykjavik, *B.* Raud-nef-stadr and Volafell, *Hd.* Hafnarfjord, *S.* Seythisfjord and Skagafjord, *Sy.*!

21. **Erysimum alpinum**, *Wahl.—St.*

E. hieracifolium, var., *Lange.*

Stadarfell, *St.*

22. **Cochlearia officinalis**, *Linn.—K.*

Hafnarfjord, *S.* It was gathered in Iceland by *Ld.*!

23. **C. anglica**, *Linn.—G.*

Videy, Breidabolstad, Reykjavik, Gronehlind, Gorpsdal, *St.* Grafaros, near Skagafjord, *Kr.* Near Kinnestadir, and between that place and Grimstadir, *T. & G.* Skagafjord, *Sy.*!

24. **C. danica**, *Linn.—S.*

There is a specimen in Solander's collection!

25. **Erophila vulgaris**, *DC.—K.*

Reykjavik, *B.* Akreyri, *C.*! Stadarfell, *St.*

26. **Draba muralis**, *Linn.—K.*

I know of no exact locality for this. It is included in the lists of K., Z., S., M., H., G., V. doubtfully, P. & Z., and L., but is omitted by Hjaltalin, and may therefore admit of doubt.

[*D. aizoïdes* (Linn.) is included in the list of P. & Z.]

27. **D. incana**, *Linn.—K.*

Reykjavik, *B.* Scalholt, *H.* Eyrarbakki, *Ld.*! Modrudalr, *Hd.* Akreyri, *C.* Lava near Hafnarfjord, *L.*! Kalfstundr, *B. G.*! Seythisfjord and Skagafjord, *Sy.*! Stiggesholm, Stadarfell, Thingvellir, Bessestad, Briam's-loek, Grapsdal, *St.* Arnes-Syssel, on roofs, *Mk.*

There are two forms of this plant in Iceland, (1) *D. contorta* (Ehrh.), and (2) *D. confusa* (Ehrh.). They seem to form one species, although several distinguished botanists have separated them. The latter, now considered the type of the Linnæan species, is, I presume, the var. *stricta* of Lindsay's 'Flora.'

28. D. RUPESTRIS, *R. Br.—B.*

Reinevallahals, *B.* Near Akreyri and Thingvellir, *C.* Staderstad, *Mk.*

This is certainly the *D. rupestris* of Fries, and apparently that of R. Brown. It is the *D. hirta* and *oblongata* of Vahl, and *D. hirta β. alpicola* of Wahlenberg. The *D. hirta* of the Arctic flora seems to be quite distinct from it.

29. D. HIRTA, *Linn.—M.*

Common, according to Mörck. Reykjavik, Alafsdal, &c., *St.* It is not included in many of the lists; for Mohr, Gliemann, Hjaltalin, and the manuscript lists of Mörck and Steenstrup alone contain it.

30. D. NIVALIS, *Liljebl.—G.*

Gliemann, Preyer and Zirkel, and Lindsay record it, but give no localities.

D. muricella (Wahl.) is the same plant.

Gliemann has *D. alpina* also; and it is included in Hornemann's manuscripts, as I learn from Prof. Lange.

31. CAPSELLA BURSA-PASTORIS, *Linn.—K.*

Reykjavik, *B.* Berufjord and Modrudalr, *Hd.* Hafnarfjord, *S.*! Seythisfjord and Skagafjord, *Sy.* Reykholar, *St.*

32. TEESDALIA NUDICAULIS, *R. Br.—S.*

There is a specimen of this plant, without any locality, amongst Solander's Icelandic plants preserved in the British Museum. He called it *Iberis nudicaulis*. He saw it in Paulsen's herbarium, and very probably obtained the specimen from that botanist.

33. LEPIDIUM CAMPESTRE, *R. Br.—K.*

This is found in König's and all the succeeding lists; but no localities are recorded.

34. SUBULARIA AQUATICA, *Linn.—M.*

Vapnafjord, *M.* Arnardragur, *St.*

35. CAKILE MARITIMA, *Linn.—K.*

Reykjavik, *B.* Hafnarfiord, *S.* Reykjafjord, *G.* Effersoe near Reykjavik, *Kr.*! Seythisfjord, *Sy.*

36. **VIOLA PALUSTRIS**, *Linn.*—*K.*
Reinevalla hals, *B.* Vatnsdal, *B. G.* Eyafjord, *T. & G.* Reykjavik, *Mk.* Olafsdal, *St.*

37. **V. CANINA**, *Linn.*, *Fr.*—*K.*
Reykjavik, *B.* Hafnarfjord, *S.*! Hafnarfjordheidi, *L.*! In a coppice by Tintron or Stelpahellir between Hrafnagja and Laugarvatn, *S.* Vithidal, *B. G.* Stikkisholm, *Robert.* Seythisfjord and Shagafjord, *Sy.* Blaakulle, *Mk.* Snaefellstrand, Olafsdal, *St.*

β. **MONTANA.**
Bredarshraun, *Mk.*

38. **V. SYLVATICA**, *Fr.*—*St.*
Krisuvik, *St.*

39. **V. TRICOLOR**, *Linn.*—*K.*
Akreyri, *C.*! *and Hd.*! Hof in Vatnsdal, *B. G.*! Stykkisholm, Seythisfjord, and Skagafjord, *Sy.*! Stadarfell, Garpsdal, *St.* Oefjord, *Kr.*

The specimens which I have seen closely resemble the usual garden plant, which is considered the type of the species.

40. **PARNASSIA PALUSTRIS**, *Linn.*—*K.*
Geysirs, *B.* Akreyri, *C.*! Between Reynivellir and Holtar, *Hd.* Havnafjord and Granfell, *S.*! Reykjahlith, Arnarvatn, and Myvatn, *B. G.*! Seythisfjord, Shagafjord, and Reykjavik, *Sy.*! Siglufjord and Eydar by the Lagarfljot, *T. & G.*

41. **DROSERA LONGIFOLIA**, *Linn.*—*K.*

I have not seen a specimen. It is probably the *D. anglica*, Huds.

42. **D. ROTUNDIFOLIA**, *Linn.*—*K.*
Hafnarfjord, *S.* Arnarvatn, *B. G.*!

43. **SILENE MARITIMA**, *With.*—*K.*
Reykjavik, *B.* By the river near Valpjofstadr, and near Torfa Jokull, *Hd.* Hafnarfjord, Molar, and Granfell, *S.* Mithfjord, *B. G.*! Stadarfell, *St.*! Œrebakka, *Kr.* Skagafjord, *Sy.*!

Dr. Lindsay, Preyer and Zirkel, Hjaltalin and Gliemann include *S. inflata* in their catalogues. I have not seen it from Iceland, and suspect that they have been misled by Zoega and König calling our present plant *Cucubalus Behen.* Benguerel enumerates both species.

44. **S. ACAULIS**, *Linn.*—*K.*
Reykjavik and Reinevallahals, *B.*! In a wood by Bolar Fjord, *H.* Randnefstadr, at foot of Orefa Jokull and near Myvatn, *Hd*! Hafnarfjord, and Granfell, *S.*! Seythisfjord and Skagafjord, *Sy.*! Siglufjord and Eyafjord, Myvatn, and Kinnoestadr, *T. & G.* Krisuvik, *St.*

[S. RUPESTRIS, *Linn.*—*G.*

This is found in Lapland; but I have no evidence of its presence in Iceland, although Gliemann includes it in his list and quotes Hornemann (vol. i. p. 490) as his authority. Vahl is in doubt concerning it.]

45. LYCHNIS ALPINA, *Linn.*—*K.*
Reykjavik, *B.* Surstheller and Arnarvatns-heidi, *Hd.*! Above the Geysirs and at Akreyri, *C.*! Hafnarfjord, Granfell, and Hekla, *S.*! Skalholt, *Mk.* Stadarfell, *St.* Seythisfjord and Skagafjord, *Sy.*

[L. VISCARIA, *Linn.*

Hjaltalin includes this species, but gives no locality for it. Lindsay and Preyer and Zirkel follow him. Hooker does not admit it into the Arctic flora. Fries excludes it from that of Lapland.]

46. L. FLOS-CUCULI, *Linn.*—*K.*
Thingvellir, *B. G.* Bruara, *Sy.*! Holte, *Z.*

47. SPERGULA ARVENSIS, *Linn.*, *Reichenb.*—*K.*
Reykjavik, *B.* Geysirs, *C.* In the tun at Hnausir, *B. G.*

48. SAGINA PROCUMBENS, *Linn.*—*K.*
Reykjavik, *B.* Hafnarfjord and Laugarnes, *S.* Krisuvik and Reykir, *St.*

49. S. SUBULATA, *Wimm.*—*G.*
I know nothing of this. Gliemann introduced it on the authority of Mörck. Vahl considers it a certain native.

50. S. SAXATILIS, *Wimm.*—*M.*
Armule, Reykir, and Olafsdal, *St.*

51. S. NODOSA, *Fenzl.*— *K.*
Reykjavik, *B.*

52. HONKENEJA PEPLOIDES, *Ehrh.*—*K.*
Reykjavik, *B.* Œlvesaa, *Z.* Laugarnes, *S.* Stafafell, Breithabolstadr in Suthersveit, and Myvatn, *T. & G.* Skagafjord, *Sy.*

53. ALSINE RUBELLA, *Wahl.*—*S.*
Reykjavik and Reinevallahals, *B.* North coast, *C.* Siglufjord, *T. & G.*
I include here the var. *hirta* of some authors; also the *Arenaria verna*, *A. rubella*, and *A. hirta* of Lindsay's 'Flora.' Fries states that the *A. hirta* of the 'Flora Danica' is the *A. rubella* of very cold countries, where the flowers scarcely expand.

A. Giesekii, which is stated by Gliemann to have been found by Mörck, is a variety of *A. rubella*.

54. A. ARCTICA, *Fenzl.*— *K.*

On the mountains at Akreyri, at an elevation of about 3000 feet, *C.*! Hafnarfjord and Thingvellir, *S.*

This corresponds tolerably well with the specimens of *A. biflora* (Wahl.) in the 'Herb. Normale' of Fries (cent. v. no. 37), from Norway, except in being much less luxuriant, and having much shorter and frequently single-flowered shoots. It also closely resembles the *A. arctica* of Hooker's 'Fl. Bor.-Americana' (t. xxxiv. B). Dr. Hooker combines them; and if this is *A. bifolia,* I fully agree with him.

55. A. HIRTA, *Wahl.*—*Mk.*

Is this the same as (53) *A. rubella*?

Leiraa, *Mk.* Reykjavik and Briamsllaek, *St.*

56. A. STRICTA, *Wahl.*

Stadarfell, *St.*

57. ARENARIA NORVEGICA, *Gunn.*—*S.*!

Reykjavik, *B.* Breid-dals-heidi, *Hd.* In the tun at Hnausir, *B. G.* Seythisfjord, *Sy.*

This is the *Alsine trifolia* of Baring-Gould's List.

[AR. CILIATA, *Linn.*—*K.*

Ness, Bessastad, and Grimansfiadle, *Z.*

Mohr refers these localities to *A. serpyllifolia* and *A. ciliata*; but they belong to the latter. Is it not probable that the plant really intended by Zoega is the *A. norvegica*? which is not included by Vahl and the earlier authors, although it is very common at Reykjavik.]

58. AR. SERPYLLIFOLIA, *Linn.*—*K.*

Hafnarfjord, *S.*

59. STELLARIA MEDIA, *With.*—*K.*

Reykjavik, *B.* Hafnarfjord, *S.* Skalholt, *Mk.* In the hot spring at Laugarnes, *L.*

[S. EDWARDSII, *R. Br.*—*V.*

Dr. Hooker considers this to be a form of *S. longipes.* Vahl marks it as a plant certainly to be found in Iceland. Lindsay only copies Vahl. I know nothing of it.]

60. S. GRAMINEA, *Linn.*

Akreyri, C.!

I have only a scrap of what seems to be the var. *juncea* of this species, the *S. juncea* of Fries (Mant. iii. 191), which is a native of Lapland.

61. S. ULIGINOSA, *Murr.*
A common plant, *Mk.* Stadarfell and Reykholtsdal, *St.*

62. S. CRASSIFOLIA, *Ehrh.—G.*
Krisuvik, Reykhollar, Stadarfell, and Reykholtsdal, *St.*

63. S. BOREALIS, *Big.*
Stadarfell and Borgarfjord, *St.*

[S. HUMIFUSA, *Rottb.—G.*
Gliemann records this plant without note or remark. Vahl considers it certainly a native. It is rare in Spitzbergen, where it is apparently confined to the north and west coasts. I very much doubt its having been gathered in Iceland, and, if to be found there, should expect its place to be in the little-known north-western peninsula.]

64. CERASTIUM TRIVIALE, *Link.—K.*
Reykjavik, *B.* Hnausir, *Bq.* Reykir, Œlverid, and Reykholar, *St.* Skagafjord, *Sy.*

Vahl and Lindsay also record the *C. triviale*, var. *holosteoides* (Fr.).

Lange sends me the following note by Krabbe: "*β. alpinum*, Koch (?), robustum, petalis calyce longioribus. Arnaes Syssel."

65. C. GLOMERATUM, *Thuil.—K.*
Hafnarfjord, *S.* Hnausir, *B. G.* Arnaes Syssel, *Kr.*

66. C. ALPINUM, *Linn.—K.*
Reykjavik and Reinevalla-hals, *B.* Akreyri, Geysirs, Raud-nef-stadr, Reykjahlind and Kulmanstunga, *Hd.*! Vithivik, *B. G.*! Kieblivik and Krisuvik, *Z.* Siglufjord, *T. & G.* Seythisfjord, *Sy.*

The varieties *lanatum* and *glabratum* are found.

67. C. LATIFOLIUM, *Linn.—K.*
Reykjavik, Nes, Bessested, and Œrebak, *Z.*

Zoega had doubts about this species; Hooker adds it as a new discovery; Vahl omits it; Krabbe says of it, "Islandia meridionalis;" and there is a specimen gathered by him at Copenhagen.

68. C. TRIGYNUM, *Vill.—K.*
Reykjavik and Reinevallahals, *B.* Akreyri, C. Rangarvalla, *Mk.* Olid, Reykholt, Garpsdal, and Thingmannaheidi, *St.*

69. C. ARVENSE, *Linn.*
Fjallebaekkeveren, *St.*

I am in doubt concerning the true spelling of this name, which I cannot find in the map.

70. **HYPERICUM PERFORATUM**, *Linn.*—*G.*

Gliemann inserts this plant on the authority of "Olavius, i. 36." [Islendsk Urtagardsbok ?].

71. **GERANIUM PRATENSE**, *Linn.*—*K.*

This is included in all the lists. I have seen a specimen gathered by Solander.

72. **G. SYLVATICUM**, *Linn.*—*K.*

Reykjavik, Ellithavatn, and Videy, *B.* Berufjord, and between Grimstadr and Myvatn, *Hd.* Hafnarfjord, *S.* Seythisfjord and Skagafjord, *Sy.*! Thingvellir, Namarfjal, Vithidal, Northrardal, and Uthlid, *B. G.* Laugarvatn, *Sy.* Kalmanstunga, and between Œfjord and Myvatn, *Kr.*

This is probably the *G. sylvestre* recorded by *O.* and *P.* as growing about Steingrimsfjord.

Gliemann adds *G. fastigiatum* (Fr.) on the authority of Mörck. I suppose that he means *G. sylvaticum β. fastigiatum* of the 'Nov. Fl. Suec.' (ed. 2, 211).

73. **G. PHÆUM**, *Linn.*—*L.*

Lindsay gives no authority for introducing this plant into the list. The old lists, beginning with König, have *G. montanum*; and P. and Z. add "of Linnæus," who has no such plant. *G. montanum fuscum* of earlier botanists is *G. phæum*. Retz (Fl. Scan. Prodr. 161) names the plant of Zoega (Fl. Isl.) *G. fuscum*, which is a synonym of *G. phæum*; and Gliemann agrees with him. Hjaltalin called it *G. fuscum s. montanum.* I think that this evidence is in favour of including *G. phæum* in the flora of Iceland.

Thienemann and Günther found what they call *G. montanum* by the Eyjafjord. Benguerel also records *G. montanum.*

74. **LINUM CATHARTICUM**, *Linn.*—*K.*

This is included in all the lists. Solander saw it in Paulsen's herbarium.

[**RADIOLA MILLEGRANA**, *Sm.*

Solander enumerates this plant, but does not name any locality for it. It is probably a mistake.]

75. **POLYGALA VULGARIS**, *Linn.*—*K.*

Seythisfjord! *Sy.*

[**RHAMNUS CATHARTICUS**, *Linn.*

Solander saw a specimen in Jonsen's herbarium, but without a locality. No one else notices it. I suspect that there was some mistake.]

[**Medicago lupulina**, *Linn.*

There is a specimen in Solander's collection. I doubt its being a native.]

76. **Trifolium pratense**, *Linn.—K.*

This is included in all the lists; but I have seen no specimen, and agree with Vahl in considering it to be a doubtful native; but Preyer and Zirkel mention that *T. pratense fl. albo* is found in the parish of Reykholar in latitude 65° 41′.

77. **T. arvense**, *Linn.—K.*

Akreyri, *B. G.*

I have not seen any specimens, and Vahl considers it to be a doubtful native. It is included in all the lists.

78. **T. repens**, *Linn.—K.*

Heinaberg, *Hd.*! Hafnarfjord, *S.*! Myvatn, *M.* Uxahver, *B. G.*! Geysirs, Reykjavik, Seythisfjord, and Skagafjord, *Sy.*

79. **Lotus corniculatus**, *Linn.—M.*

Mohr appears to have added this to the list. Vahl marks it as doubtful. Hjaltalin includes it without any doubt.

80. **Anthyllis vulneraria**, *Linn.—K.*

Hafnarfjord, *S.* Mosfell, *M.* Kopavogr near Reykjavik, and Seythisfjord, *Sy.*! Balandshofden, *Mk.*

81. **Vicia cracca**, *Linn.—K.*

Raud-nef-stad, *Hd.*! Hafnarfjord, *S.* Eydar on the Lagarfljot, *T. & G.* Myvatn, *M.* Reykjavik, Seythisfjord, and Skagafjord, *Sy.* Oefjord-Elvan, *Kr.*

82. **V. sepium**, *Linn.*

There is an Icelandic specimen in Steenstrup's collection at Copenhagen.

83. **V. angustifolia**, *Roth.*

Bildadal, *St.*

84. **Lathyrus pratensis**, *Linn.—K.*

There is an Icelandic specimen in Steenstrup's collection at Copenhagen.

85. **L. maritimus**, *Bigel.—K.*

Selsundsfjall, Kangaa, and at the foot of Hekla, *Z.* Granfell, *S.* On the islands in Alphtafjord, *G.* Skagafjord, *Sy.* Near Kinnaestadr, *T. & G.* Shore of Thingvalla Vatn, *C.*

86. SPIRÆA ULMARIA, *Linn.—K.*
Geysirs, *B.* Between Reynivellir and Holtar, *Hd.* Hafnarfjord, *S.* In Fnioskedal, *G.* Borgar in Hordr-syssel, *Kr.*

87. SANGUISORBA OFFICINALIS, *Linn.—K.*
Mossfells-heidi, *Z.*, *M.*, and *G.* Kaunesta Hraun, *S.*

88. ALCHEMILLA VULGARIS, *Linn.—K.*
Reykjavik and Thingvellir, *B.* Akreyri and Raud-nef-stadr, *Hd.* Hafnarfjord, *S.*! Abundant near the north coast, *C.* Seythisfjord and Skagafjord, *Sy.*

Olafsen and Povelsen say that "*Alchemilla* (*utrinque*)" grow about Steingrimsfjord, by which they doubtless mean *A. vulgaris* and *A. alpina.*

The *A. montana* of Gliemann is probably only a variety of this species. He records it on the authority of Mörck.

89. A. ALPINA, *Linn.—K.*
Reykjavik and Reynivallahals, *B.* Kieblevik, *Z.* Geysirs, and between Reynivellir and Holtar, *Hd.* Hafnarfjord, *S.*! Abundant near the north coast, *C.* Siglufjord, *T. & G.* Krisuvik, *S.* Oefjord, *Kr.* Seythisfjord and Shagafjord, *Sy.*!

[A. ARVENSIS, *Scop.*

Lindsay and Preyer and Zirkel add this to the list. They give no authority for it; and the plant is not noticed by any other author. I have much doubt concerning it. The peculiarities in their lists show that they derived information from a common source.]

90. SIBBALDIA PROCUMBENS, *Linn.—K.*
Reynivallahals, *B.* Mountains at Akreyri, *C.*! Siglufjord, *T. & G.* Stappen, *Mk.* Snaefells-nes Syssel, *K.*

91. POTENTILLA ANSERINA, *Linn.—K.*
Reykjavik, *B.* Hafnarfjord and Laugarnes, *S.*! Near the Geysirs, and at Seythisfjord and Skagafjord, *Sy.*!

92. P. MACULATA, *Pourr.—S.*
Reykjavik, *B.* Geysirs, *C.*! Skagafjord and Seythisfjord, *Sy.*! Breiddals-heidi, *Hd.* Budnestad, *Mk.* Stadarfell, Krisuvik, and Breidabolstad, *St.* Almannagja, *Kr.*

P. verna and *P. aurea* are also included in most of the lists, but they appear to be synonyms of *P. maculata* in these cases. Gliemann records Hunavatns Syssel as the locality of the former. Hjaltalin has *P. verna* and *P. aurea*, but not *P. maculata.* Baring-

Gould records those two and also *P. maculata*, and gives localities for *P. aurea* at Norbradal, Longvatn, and Midfjord. His specimens are *P. maculata.*

[P. ARGENTEA, *Linn.*

Preyer and Zirkel include this, but give no authority.]

93. P. TORMENTILLA, *Sibth.—M.*

Seythisfjord, *Sy.*!

94. P. COMARUM, *Nesl.—K.*

Reykjavik, *B.* Selsund, Reykholt, and Akreyri, *Hd.*! Hafnarfjord, *S.*! Seythisfjord and Skagafjord, *Sy.*!

95. FRAGARIA VESCA, *Linn.—K.*

Reykjavik, *B.* Heckla, *Z.* Hafnarfjordarhraun, Seythisfjord, and Skagafjord, *Sy.*! Laugarvatn, *B. G.*! Thordarhofdi, *Olafsen.* Leiraa and Skalholt, *Mk.* Stadarfell, *St.*

I am convinced that the plant which I gathered is *F. vesca.* Vahl includes *F. collina* (Ehrh.); and Lindsay follows him. Is it not probable that there is some mistake here? *F. collina* is a very distinct species (see J. Gay in Bull. Soc. Bot. Fr. viii.). It is stated that *F. vesca* does not usually produce fruit in Iceland.

96. RUBUS SAXATILIS, *Linn.—K.*

Reykjavik and Geysirs, *B.* Hafnarfjord, *S.*! Thingvellir, Ljosvatn, and Laugarvatn, *B. G.*! Stadarfell, *St.* Seythisfjord and Skagafjord, *Sy.*! Common in the northern and eastern parts, *G.*

Horrebow, in his 'Natural History of Iceland' (Tilforladelige Eftessetniger om Island), is in the English translation made to state that *Blackberry Bushes* are common in the island; in the French translation it is "quelques petits buissons tels que de ronces." In the original "som Bromboer" is the term used; and that is the name of the common Bramble in Gothland, as stated by Wahlenberg, and in Norway, according to Gunner. It is clear that Horrebow made a mistake; for the only *Rubus* known to exist in Iceland is *R. saxatilis.* The plant which he had in view is the *Empetrum nigrum*, as I learn from my friend Eirikr Magnüsson.

97. DRYAS OCTOPETALA, *Linn.—K.*

Reykjavik, *B.* Geysirs and at Akrevri, *C.*! Hallormstadr-hals, *Hd.* Krisuvik, *Z.* Hafnarfjord, *S.*! Hrafnagja and Seythisfjord, *Sy.*! Siglufjord and Eyafjord, *T. & G.*

98. GEUM RIVALE, *Linn.—K.*

Reykjavik, *B.* Sweinascaur, and by way to Krisuvik, *H.* Kalmannstunga, *Kr.* Hvita and Skaptar-tunga, *Hd.* Seythisfjord, Skagafjord, and Ellitharvatn, *Sy.* !

Dr. Lindsay also records what he calls var. *intermedium.*

99. ROSA SPINOSISSIMA, *Linn.—H.*

Discovered by Swein Paulsen, and sent by him to Hooker. He wrote with the specimen, "crescit in rupe unica ad villam Seljaland." Thienemann and Günther were directed to the spot by Paulsen, and "were fortunate enough to find the rose growing on a detached basaltic rock. There were altogether about twenty bushes, about two feet high. It was in fruit on Aug. 27." (Reise im Nord. Europ. p. 332.) Seljaland is a farm between the foot of Eyjafjalla Jokull and the Markarfljot, in lat. 63° 36′.

Lindley says that "its strong vigorous shoots led Mr. Hooker into the error of considering it *R. hibernica.*"

Fries tells us (Nov., ed. 2, p. 157) "specimina Norvegica hujus speciei [*R. spinosissima*] cum Islandicis [*R. hibernica,* Hook. It. Is.] a Mörck lectis et communicatis conveniunt."

There can be no doubt that this is the *R. canina* which Solander saw in S. Paulsen's Herbarium.

Mörck seems, from Gliemann's remark, to have originally supposed that his specimens belonged to the *R. kamtschatica*; hence the introduction of that name into the Icelandic list. Gliemann apparently did not see the specimens, and so has both *R. hibernica* and *R. kamtschatica* in his catalogue. Lindsay, for the same reason, has two roses which he calls *R. villosa,* var. *hibernica,* and *R. pimpinellifolia.* Paulsen's specimens in the Kew Herbarium are certainly a state of *R. spinosissima,* of which *R. pimpinellifolia* is a synonym. There are similar specimens given by Dawson Turner in the Herbarium at Newcastle-on-Tyne, as I learn from Mr. J. G. Baker.

100. PYRUS AUCUPARIA, *Gaert.—H.*

Hafnarfjord, *S.* Husavik and Vapnafjord, *G.* Modrufelsjal, *Robert.* Henderson saw stunted trees in Morardal, near Skaptafell, by the Skeidara river. Budarhraun, *Mk.* Briamsloek, *Kr.*

Hooker records *P. domestica* on the authority of a specimen obtained by Sir G Mackenzie from a tree eight feet high, which was growing out of a cleft of lava at Budirstad in Snaefell Syssel. Mackenzie also had it brought to him from Eyjasfjord, where we are told by Mohr that *P. Aucuparia* grows near Modrufells Hospital. Robert says that the trees by the Hospital are *P. Aucuparia,* and denies the existence of *P. domestica* in Iceland.

In all probability Sir W. J. Hooker and Sir J. E. Smith were wrong in their determination of the plant, about which we are told that they found much difficulty.

101. EPILOBIUM LATIFOLIUM, *Linn.*—*K.*
Sandy river-bed to the south-east of Torfa Jokull, under Oroefa Jokul, and at Skeidarar Sandr, *Hd.*! In a ravine near Akreyri, *C.*! Hrutafjord and Kollfjord, *M.* Stafafell and Breithabolstad in Suthersveit, and banks of Jokulsa near Kinnaestad, *T. & G.* Gronnafjord, *Mk.* Hvita inMyrasyssel, *Sy.* !

102. E. ANGUSTIFOLIUM, *Linn.*—*K.*
Near Leera by Borgarfjord, *H.* Eyjafjord river, *B. G.* Breithabolstad in Suthersveit, *T. & G.*

[E. FLEICHERI, *Hochst.*
Hjaltalin has this species; but all the rest have excluded it, until recently Lindsay and Preyer and Zirkel have restored it to the flora. I doubt its being a native plant. There is a specimen of *E. angustifolium* which was named *E. angustissimum*? (the name used by *P.* and *Z.*) by Paulsen in the Herb. Hooker.]

103. E. MONTANUM, *Linn.*—*K.*
Reykjavik, *B.* Eyjafjord river, *B. G.*
Mr. Newbould has doubts concerning the correctness of the name. He has examined my specimens and also that placed by me in the Herb. Hooker. Nevertheless I think that the plant is *E. montanum.* It is recorded in all the lists.

[E. TETRAGONUM, *Linn.*—*K.*
This is included in all the lists; but Vahl doubts if it is a native.]

104. E. PALUSTRE, *Linn.*—*K.*
Reykjavik and Geysirs, *B.* Hafnarfjord and Granfell, *S.*! Head of Eyjafjord, *B. G.* Skagafjord, *Sy.*!
This is *E. virgatum* of my list.

105. E. ALPINUM, *Linn.*—*M.*
Maria Haven* and Reykjavik, *B.* Hafnarfjord, *S.* Lonsheidi near Stafafell, *T. & G.* Snaefells Jokull, *Mk.* Armule, *St.*
Gliemann records *E. nutans* on the authority of Mörck. It is probably *E. alpinum* or *E. palustre.*

106. E. ALSINIFOLIUM, *Vill.*—*H.*
By a mountain-torrent above Akreyri, *C.*! Eyjafjord, *B. G.* Hafnar-

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* This place was so named for me by a pilot from Reykjavik; but as it seems to be the bay called Laxarvogr on Olsen's map, I shall so name it in future.

fjordrhaun and Seythisfjord, *Sy.*! Skalholt, *Mk.* Sandlangadal, Stadarfell, and Garprdal, *St.*

It appears to have been first found by Paulsen in 1809.

107. MYRIOPHYLLUM SPICATUM, *Linn.*—*K.*
Reykjavik, *B.*

There is a specimen in the British Museum, collected by Solander.

108. M. ALTERNIFLORUM, *DC.*
Steenstrup has a specimen from Holt.

109. M. VERTICILLATUM, *Linn.*—*K.*
Hafnarfjord, *S.*

110. HIPPURIS VULGARIS, *Linn.*—*K.*
Reykjavik, *B.* Hafnarfjord, *S.* Seythisfjord and Skagafjord, *Sy.*

111. MONTIA FONTANA, *Linn.*—*K.*
Reykjavik, *B.* In the hot spring at Laugarnes, *L.*! On the red soil above the Geysir, *B. G.* Skalholt and Thingvellir, *Mk.* Breidabolstad, *St.*

112. SCLERANTHUS ANNUUS, *Linn.*—*K.*

This is included in all the lists; but Vahl considers it to be a doubtful native. It does not occur in Lapland, according to Fries; nor is it in Hooker's Arctic list.

113. SEDUM RHODIOLA, *DC.*—*K.*
Reynivalla-hals, *B.* Alftafjord, *Hd.* Hraun near Reykjavik, *H.* Hafnarfjord and Granfell, *S.* Olid and Reykholt, *St.* Almannagja, Seythisfjord, and Skagafjord, *Sy.*!

114. S. ANGLICUM, *Huds.*—*G.*

Gliemann introduced this into his list on the authority of Mörck. Baring-Gould states that he found it at Reykir. Vahl considers it a doubtful native, and so do I.

115. S. ALBUM, *Linn.*—*Hj.*

Hjaltalin includes this in his Flora; and Solander states that he saw it in Paulsen's herbarium. It does not extend to Lapland, and is not in Hooker's Arctic list.

116. S. VILLOSUM, *Linn.*—*K.*
Reykjavik, *B.* Akreyri and Geysirs, *C.*! Breiddalsheidi and to the south of Ok Jokul, *Hd.* Hafnarfjord and Thingvellir, *S.*! Krisuvik, *Z.* At the entrance of Hordardal, *B. G.* Seythisfjord and Skagafjord, *Sy.* Capella-hraun near Krisuvik, *Mk.* Stadarfell, *St.* Oefjord, *Kr.*

117. S. ACRE, *Linn.*—*K.*

Hafnarfjord, *S.* On rocks in the eastern districts, *G.* Sletta and Stadarfell, *St.* Near Skagastrand factory and Bulandsness, *M.* Skagafjord, *Sy.* !

118. S. ANNUUM, *Linn.*—*K.*

Stadarfell and Armule, *St.*

Hooker records *S. saxatile.* It is probably a synonym of *S. annuum* in this case, as in many others: or can it have been the true plant, the *S. Œderi* (Retz.)? for Hooker gives *S. annuum* in addition, and marks the *S. saxatile* as added to the flora by him; also most of the lists include *S. rupestre*, meaning probably the plant of the 'Fl. Danica,' which is apparently the same as *S. annuum*; but Hjaltalin places them as *S. annuum s. anglicum*, and *S. saxatile s. rupestre.* It appears therefore that he thought that there are two species, but was doubtful concerning their names.

119. BULLIARDIA AQUATICA, *DC.*—*K.*

By Laugarvatn, *K.* Steenstrup found it in Iceland.

120. SAXIFRAGA COTYLEDON, *Linn.*—*Z.*

Hekla, *Z.* Brunnir, *B. G.* Heydalir in Breithdal, *T. & G.*

121. S. AIZOON, *Jacq.*—*V.*

Hafnarfell, *St.*

Hooker does not separate this from *S. Cotyledon*, and did not know it as Icelandic. Vahl marks it, as well as *S. Cotyledon*, as certainly a native. I am informed by Lange that nothing is known at Copenhagen of *S. Cotyledon* (which rests mainly on the authority of Zoega) or *S. cuneifolia* as natives of Iceland.

[S. CUNEIFOLIA, *Linn.*—*G.*

This is almost certainly a mistake. It is difficult to tell what the *S. punctata* of K., Z., S., and H. may have been. It can scarcely be the *S. cuneifolia*, to which Hj., G., and P. & Z. apparently refer it, and is hardly likely to be the real *S. punctata* (Linn.), although that plant is a native of Siberia and North-west America.]

122. S. OPPOSITIFOLIA, *Linn.*—*K.*

Reykjavik, *B.* Skoulafjeld, *H.* Oxeraa, *Z.* Granfell, *S.* Siglufjord, *M.* Esia near Reykjavik, *St.* Knausir in Hunavatn Syssel, *Kr.*

Olafsen found it with white as well as blue flowers on the upper part of Snaefels Yokul.

123. S. HYPNOIDES, *Linn.*—*K.*

Reynivalla-hals, *B.* Above Akreyri, *C.* On the side of Ok, *B. G.* (he names it *S. cæspitosa*). Raudnestad, *Hd.* Olafsdal, Thingvellir, Krisuvik, Raudamel, Stikkesholm, and Breidalbolstad, *St.*

Icelandic specimens are figured in 'Fl. Dan.' t. 348.

Probably *S. palmata* of Hooker's list should be placed here; but he arranged it between *S. Hirculus* and *S. punctata.* His *S. punctata* is probably the form of *S. nivalis* which is so named by Rottboll, the *β. tenuis* of Wahlenberg. It does not seem likely that the true *S. punctata* (Linn.) grows in Iceland.

124. S. CÆSPITOSA, *Linn.*—*K.*

Reykjavik, Reynivalla-hals, and Thingvellir, *B.* Breiddalsheidi and Selsund, *Hd.* Hafnarfjord and Granfell, *S.* Hrafnajia and Seythisfjord, *Sy.* Eyafjord, *T. & G.* Stappen, *Mk.* Krisuvik, Borgarfjord, and Hredavatn, *St.* Mosfell near Reykjavik, *Kr.*

β. GRŒNLANDICA.

Reykjavik and Olafsvik, *Mk.*

S. grœnlandica (Linn.) is probably a form of this species, including many of the more compact maritime states "foliis conglomeratis corrugatis imbricatis." K., Z., M., and H. record it, and Sir G. Mackenzie is stated to have gathered it. *S. decipiens* of Gliemann's list also belongs here. *S. tricuspidata* (Retz.), of which there is a figure in 'Fl. Dan.' (t. 976), does not seem ever to have been gathered in Iceland. Hooker introduced the name. He saw what he thought might be it abundantly at Reykjavik, but found no flowers, and lost his specimens. I saw an abundance of the compact form of *S. cæspitosa* at that place, but could not find *S. tricuspidata*; and others have been equally unsuccessful. Baring-Gould records Thingvellir as a locality for it; but his specimens are compact *S. cæspitosa.* G., Hj., V., P. & Z., and L. include it in their lists, but record no localities. Vahl expresses doubt concerning it.

125. S. PETRÆA, *Linn.* ?—*K.*

Oxeraa, *Z.* and *M.* Hafnarfjord, *S.*

Vahl does not know it to be a native, and Solander had doubts. Perhaps P. & Z. intend this single plant by the two names of *S. petræa* and *S. geranioides.* The true *S. geranioides* is a southern plant, and so is *S. petræa.*

126. S. TRIDACTYLITES, *Linn.*—*K.*

Oxeraa, *Z. & M.* Granfell, *S.*! Thingvellir and Myvatn, *B. G.*!

127. S. CERNUA, *Linn.*—*K.*

Mountains near Akreyri, *C.*! Almannagja, *H.* Granbakken, *M.*

Hnausir in Hunavatn Syssel, *K*. Adner-See, Saudafjall, Hrafntinnafjall, Krabla, *Z*.

Zoega also records *S. bulbifera*; and Lindsay adds var. *racemosa*. Theinemann and Günther mention *S. bulbifera* as growing at Husavik and between Kinnoestadr and Grimstadr. Hornemann also mentions it. Nothing is known of it at Copenhagen.

128. S. RIVULARIS, *Linn.*—*K.*

Reynivalla-hals, *B*. Akreyri, *C.*! Hekla, *Z*. Granfell, *S*. Olid, Olafsdal, Gronahlid, Hredavatn, and Thorssengismule, *St*. Almannagja, *H*. Near Holmar by Reydarfjord, and at Husavik, *T. & G*.

129. S. GRANULATA, *Linn.*—*G.*

Gliemann recorded this plant as a native on the authority of Mörck, who says that it is frequent. Vahl marks it as being really to be found.

130. S. NIVALIS, *Linn.*—*K.*

Reykjavik and Reinevalla-hals, *B*. Krisuvik, *Z*. Hafnarfjord and Granfell, *S.*! Holmar, Reydarfjord, and Lonsheidi near Stafafel, *T. & G*. Breidabolstad and Briamsloek, *St*. Seythisfjord, *Sy*.

Probably this is the plant intended by *S. punctata* in Hooker's list.

Krabbe has a var. *pumila* also.

131. S. STELLARIS, *Linn.*—*K.*

Reykjavik, *B*. Sandy bed of a river on the south side of Torfa Jokul, *Hd.*! Holmar on Reydarfjord and Lonsheidi near Stafafell, and Husavik, *T. & G*. Stappen and Granbakken, *Mk*. Sletta, Krisuvik, and Stadarfell, *St*. Oefjord, Skagafjord, *Kr*.

132. S. HIRCULUS, *Linn.*—*M.*

Reynevalla-hals, *B*. Jokuldal and Stafafell, Breiddalsheidi, Hvita, and Eldvatn, *Hd.*! To the east of Reykjavik, *H*. On the side of Ok Jokul, *B: G*. Holmar by Reydarfjord, and Lonsheidi near Stafafel, and between Kinnaestad and Grimstad, *T. & G*. Kollafjordrheidi and Reykholt, *St*. Oefjord and Skagafjord, *Kr*. Seythisfjord and Seljadal, *Sy.*!

133. S. AIZOIDES, *Linn.*—*K.*

Breiddalsheidi and Jokuldal near Stafafell, *Hd.*! Near Holmar on the Reydarfjord, Lonsheidi near Stafafell, and between Kinnaestad and Grimstad, *T. & G*.

This includes the *S. autumnalis* of several of the lists.

134. HYDROCOTYLE VULGARIS, *Linn.*—*K.*

Skalholt and Reykium, *S*.

135. **Angelica sylvestris**, *Linn.*—*K.*

Hafnarfjord, *S.* Berufjord, *Hd.*! Little Arnarvatn, *B.G.* Borgarfjord Syssel, *Kr.* Skagafjord, *Sy.*

This is not included in Zoega's Flora as published in the German edition of Olafsen and Povelsen's work, but is found in the original Danish edition.

136. **A. archangelica**, *Linn.*—*K.*

Islands in Myvatn, *B. G.* Oefjord, *Kr.* Suthrey at the upper end of Breithifjord, *Robert.*

Olafsen and Povelsen say that it inhabits the waste islands in Breithifjord. It is said to be abundant in the northern parts of the country. It is also much cultivated.

137. **Peucedanum Ostruthium**, *Koch.*—*K.*

Recorded as a native plant by all except Vahl, who doubts its claims. Olafsen and Povelsen state that it grows on the waste islands in the upper part of Breithifjord.

138. **Haloscias scotica**, *Fr.*—*K.*

Near Leira by Borgarfjord, *H.* (i. 328). Slappen, *Mk.*

139. **Ægopodium podagraria**, *Linn.*—*G.*

In Skalmersdale coppice, *G.*

140. **Carum Carui**, *Linn.*—*K.*

Thingvellir (naturalized?), *B.*! Skagafjord and at Reykjavik, *Sy.*! Videy near Reykjavik, *Mk.* Hlitharende in Rangarvalla (Olafsen), *G.*; but Mackenzie tells us that it was sown there.

Also much cultivated in Iceland; but it may very probably be really a native plant.

141. **Hedera Helix**, *Linn.*—*G.*

Borg in Vithidal, *B. G.*

Gliemann added it to the list on the authority of Mörck. There is a specimen in Hornemann's herbarium.

142. **Cornus suecica**, *Linn.*—*G.*

Gronnefjord, *M.* Briamsloek, *St.*

143. **Galium boreale**, *Linn.*—*K.*

Thingvellir, Geysirs, Laxavohr in Hval Fjord, *B.* Selsund, *Hd.* Siglufjord, *T. & G.* Near Modrufels Hospital, *M.* Reykjavik and Seythisfjord, *Sy.* Olafrdal, *St.*

144. **G. Aparine**, *Linn.*—*P. & Z.*

Preyer and Zirkel include this plant without doubt. Baring-

Gould says that it is abundant. I may be allowed to have some little doubt concerning it.

145. G. **Mollugo**, *Linn.*—*K.*

Hafnarfjord, *S.* In great abundance near Modrufels Hospital, *G.*

146. G. **verum**, *Linn.*—*K.*

Reykjavik, *B.* Jokulsdalr and near Stafafell, and Selsund, *Hd.*! Hafnarfjord, *S.* Myvatn, *G.* Seythisfjord and Skagafjord, *Sy.*

Gliemann has a var. *pallidum* of *G. verum*, which is probably the cause of the addition of *G. pallidum* to the list by P. & Z. The true *G. pallidum* (Pr.), which is considered the same as *G. cinereum* (All.), is a very unlikely plant to be found in Iceland.

147. G. **saxatile**, *Linn.*—*G.*

In the southern parts, according to *Gudmunson*; *Ld.*

Vahl considers it to be a true native.

148. G. **sylvestre**, *Poll.*—*G.*

Reykjavik, and near the Geysirs, *B.* Grimestunga, in Vatnsdalr, *B. G.*! Kalmanstunga and Raudnefstadr, *Hd.* Thingvellir, Seythisfjord, and Skagafjord, *Sy.*!

This is the *G. pusillum* of my list. Apparently the plants named *G. saxatile*, var. *pusillum* and var. *sylvestre*, by Lindsay, are only the one form called usually *G. sylvestre* by modern botanists.

Gliemann includes *G. trifidum*, and Vahl marks it as possibly native. Hornemann also includes it.

G. pusillum (Lam.) is another plant unaccountably included.

149. G. **uliginosum**, *Linn.*—*V.*

Here and there in marshes, *Mk.*

150. G. **palustre**, *Linn.*—*K.*

I have no locality to record; but all the lists include it, and it is likely to be a common plant.

151. **Valeriana sambucifolia**, *Mikan.*—*K.*

Holte-Praestergaard, *Z.* Geysirs and Reykjavik, *Mk.*

Steenstrup, as well as all the older authors, records *V. officinalis*; but Prof. Joh. Lange informs me that the specimens at Copenhagen are *V. sambucifolia.*

152. **Scabiosa succisa**, *Linn.*—*K.*

I have no locality to name; but all the lists include it.

Gliemann adds *S. alpina* on the authority of Hooker; but I find no mention of it by him. P. & Z. also include it; but it is not a likely plant to occur.

153. TUSSILAGO FARFARA, *Linn.—V.*
Near Eyafjord, *T. & G.* Common in low spots, *B. G.*

154. ERIGERON ALPINUS, *Linn.—K.*
Reykjavik, Widoe, and Garde-hraun, *B.* Akreyri and Thingvellir, *C.*! Husevik, *Z.* Geysirs and Breiddalsheidi, *Hd.* Hafnarfjord, *S.*! Skagafjord, *Sy.*! Capellahraun, *Ek.* Armule, Stadarfell, Hredavatn and Briamsloek, *St.* Oefjord, *Kr.*

This is probably the *E. uniflorus* of Z., S., and M.; but the var. *uniflorus* is also found, according to V. and K. and G. Both plants may have been found, but I do not possess any certain information to that effect. T. & G. state that the var. *uniflorus* grows at Siglufjord and at Eydar by the Lagarfljot.

155. BELLIS PERENNIS, *Linn.*
Seythisfjord, *Sy.*!

These are the only specimens that I have either seen or heard of from Iceland. They were sent by a collector of flowers, not a botanist, to Mr. Symington, who gave a few to me.

156. ACHILLEA MILLEFOLIUM, *Linn.—K.*
Akreyri, *C.*! Hafnarfjord, *S.*! Valthjof-stadr and Modrudalr, *Hd.*! Oefjord, *G.* Seythisfjord, Skagafjord, Hafnarfjord, and Thingvellir, *Sy.*!

Solander also saw *A. Ptarmica* in Paulsen's herbarium, and Hornemann likewise records it.

[ANTHEMIS COTULA, *Linn.*
P. & Z. record this plant. B. G. says that he found it at Myvatn.]

157. ?MATRICARIA INODORA, var. BOREALIS, *Hartm.*
Hafnarfjord, *Mk.* On walls and roofs at Reykjavik, *Kr.*
Is this the same as the following?

158. M. MARITIMA, *Linn.—K.*
Reykjavik, *B.* Hafnarfjord, *S.*! Nikliboer, *Hd.*! Akreyri, *C.*! Geysirs and Skagafjord, *Sy.*

My specimens have the "involucrum basi truncatum subumbilicatum" of the *Tripleurospermum maritimum* (C. H. Schultz), not the "involucrum basi initio turbinatum" of his *T. inodorum.* The only British specimen which I have seen, that appears to belong to the *T. maritimum*, was gathered in Orkney. The plant that grows at Cockbush, near Chichester, is not the *T. maritimum*, but has the involucre of *T. inodorum.* It is the no. 7 of Ray, and his no. 8 is possibly the *Matr. maritima.* All the oldest Icelandic lists include *M. inodora*, not *M. maritima*; those compiled since that of Hooker enumerate both of them. Dr. Seemann's specimens from Arctic North-west America are like mine from Iceland; and I consider them to be *M. maritima*. Benguerel enumerates *M. Chamomilla*—in mistake, I presume, for this form of *M. maritima*.

159. **ARTEMISIA VULGARIS**, *Linn.*

Solander saw specimens of this plant in Paulsen's Herbarium. No other author mentions it.

[**TANACETUM VULGARE**, *Linn.*—*B. G.*

Within the fence round the grassplot before the Governor's house at Reykjavik, *B. G.* Most probably introduced.]

160. **GNAPHALIUM ULIGINOSUM**, *Linn.*—*K.*

Geysirs, *B.* Akreyri, *C.*

161. **G. NORVEGICUM**, *Gunn.*—*K.*

Breiddalsheidi, *Hd.*! Leiraa, *Mk.* Skagafjord and Skardsheidi in Myrasysla, *Sy.*! Rada and Skälärvik, *S.*! Between Thorskafjord and Thingmans-heidi, *Olafsen & Povelsen*.

This is the *G. fuscatum* (Pers.), the *G. sylvaticum* of the Icelandic lists, and is figured from Icelandic specimens in 'Fl. Dan.' t. 254. Dr. Lindsay names the *G. sylvaticum* (Linn.) as a native plant, as do also P. & Z. Vahl did not know of it; and I have great doubts concerning its existence in Iceland. The *G. norvegicum* appears under this name in the older lists. Hooker includes both, and thought that he had added the *G. sylvaticum* to the flora. I am uncertain if he really meant to distinguish the plants. Mohr calls it *G. norvegicum sylvatico affine*. Hjaltalin has both *G. sylvaticum* and *G. rectum*.

162. **G. SUPINUM**, *Linn.*—*G.*

Eyjafjord, *C.*! Skagafjord, *Sy.*!

G. alpinum (*fuscum*, W.) of Gliemann is probably this plant, although he has *G. supinum*. There is some confusion about the names in his list, which is not very carefully printed.

163. **ANTENNARIA ALPINA**, *Gært.*—*K.*

Solander saw it in Paulsen's herbarium. Olafsen and Povelsen say that it grows between Thorskafjord and Thingmansheidi. It is the *G. carpaticum* of P. & Z.

164. **A. DIOICA**, *Gært.*—G.

There is a specimen in Solander's collection. Gliemann records it without any remark. Olafsen and Povelsen found it between Thorskafjord and Thingmans-heidi.

165. SENECIO VULGARIS, *Linn.*—*K.*

Solander saw this in Paulsen's herbarium; and Baring-Gould says that it is common on the Heithies. It is included in all the lists.

[S. SYLVATICUS, *Linn.*

Baring-Gould states that this grows on the Heithies; and Lindsay and Preyer and Zirkel record it, but without any locality. I have not seen any specimen, and have much doubt concerning it.]

166. S. JACOBÆA, *Linn.*—*S.*

Reikium, *S.* On the Heithies, *B. G.*

I have some doubt of its having really been found.

[CENTAUREA CYANUS, *Linn.*—*S.*

Solander saw this in Paulsen's herbarium. I much doubt its being a native.]

[CARDUUS ACANTHOIDES, *Linn.*—*G.*

Gliemann records this plant. Vahl has doubts, and so have I. Hornemann gives Kœnig as the authority.]

[C. LANCEOLATUS, *Linn.*—*K.*

Vahl takes no notice of this plant, and I have great doubts about it. It is included in König's 'Flora,' and copied into the lists of all his successors.]

167. C. ARVENSIS, *Curt.*—*K.*

Solander saw this in Paulsens's herbarium. It is the *Serratula arvensis* of König and others.

168. C. HETEROPHYLLUS, *Linn.*—*M.*

Gliemann says that, according to Olafsen (p. 679), it grows at Oefjord.

169. APARGIA AUTUMNALIS, *Willd.*—*K.*

Geysirs, *B.* Berufjord, *Hd.*! Hafnarfjord *S.*! Thingvellir and Vatnskarth, *B. G.* Siglufjord, *T. & G.* Olafsdal and Snaefelsnes-Syssel, *St.*

β. TARAXACI, *Hook.*

Hedypnois Taraxaci, *Hook.*

Reykjavik, *B.* Blaakulle, in Skarshedi, *M.*

Krabbe says that it is common.

An intermediate form was found by Mr. Holland at Berufjord.

Gliemann has *Ap. Taraxaci* and *Hedypnois Taraxaci*, both on the authority of Hooker; but he is in error, for Hooker has only the latter name.

170. LEONTODON TARAXACUM, *Linn.*—*K.*

Common nearly throughout the island, *G.* Reykjavik, *B.* Hafnarfjord, *S.*; Holar, *B. G.* Seythisfjord, *Sy.*!

Gliemann has also *L. palustre* on the authority of Mörck.

The plant which I gathered resembles the *Tax. officinale obliquum* of Fries. Its phyllaries are all nearly similar in shape. Those of the outer row are rather broader than the others; they are erect with flowers, but become patent and lax with fruit. The leaves are broad, with two or three large runcinate teeth towards the tip, and many smaller ones below. Is it the *L. phymatocarpum* of Vahl in 'Fl. Dan.' (t. 2298)? Lange considers the specimen from Iceland in Herb. Hornemann to be *L. palustre*.

171. CREPIS PRÆMORSA, *Tausch.*—*K.*

Solander states that he found it at Hafnarfjord. It is included in all the lists from the time of König; but no localities are recorded. Vahl doubts its claims to be in them.

[Benguerel includes *Hieracium* (*Crepis*) *sibiricum*.]

172. HIERACIUM PILOSELLA, *Linn.*—*K.*

Hafnarfjord, *S.* Briamsloek, *S.*

173. H. FLORIBUNDUM, *Wimm., Fr.*

Stadarfell, *St.* Snaefells-Syssel, *Kr.*

174. H. AURICULA, *Linn.*—*K.*

Hafnarfjord, *S.*! Myvatn, *M.*

H. aurantiacum (Linn.) is recorded by Gliemann on the authority of Mörck. Vahl doubts its presence.

175. H. ALPINUM, *Linn.*—*K.*

Geysirs, *B.* Stappen, *Mk.* Stadarfell, *St.*

My solitary specimen seems to belong to the *H. holosericeum* (Backh.), which I believe to be distinct from the true *H. alpinum*.

176. H. CÆSIUM, *Fr.*—*Hj.*

This is the *H. Lawsoni* of my list, the *H. murorum* of most of the other lists.

Reykjavik, Wiiḍoe, and Reynivalla-hals, *B.* Eyjafjord, *C.*! Seythisfjord, *Sy.*! Groenahlid and Briamsloek, *St.* Almannagja, *Kr.*

There seems no reason to doubt that we have all gathered the same plant in Iceland; for we have all apparently visited the same districts. The specimens which I have seen all seem to be *H. cæsium*.

Hornemann records *H. prenanthoides* as probably found in Iceland. It seems unlikely to occur there.

177. CAMPANULA ROTUNDIFOLIA, *Linn.—G.*

Berufjord, *Hd.*! Common in Mule Syssel, *G.* Seythisfjord and Skagafjord, *Sy.*! (this is the plant with lanceolate stem-leaves). Sletta and Groenahlid, *St.*

[C. PATULA, *Linn.—G.*

Gliemann says that this plant is very rare, and does not name any locality for it. He gives as his authority "Olavius (437)." It is probable that Vahl is right in rejecting it. May not the plant of Olavius have been a large state of *C. rotundifolia*? Mohr says that Olavius found it between Vapnefjord and Fljotsdal.]

178. ARCTOSTAPHYLOS ALPINA, *Spr.—K.*

Vahl doubts if this has been found; all the other authors record it without question.

179. A. UVA-URSI, *Spr.—K.*

Thingvellir, *B.* Near Hekla, *Ld.* Surtshellir, *Hd.*! Hafnarfjord, *S.* Fnioskedal, *G.* Myvatn, *T. & G.* Uxahver, *B. G.* Seythisfjord and Skagafjord, *Sy.*! Stappen, *Mk.* Kollafjorder-heidi, *St.*

180. ANDROMEDA HYPNOIDES, *Linn.—K.*

Reynivalla Hals, *B.* Mountains above Akreyri, *C.*! Lava near Reykjavik, and a little beyond Hrafnagja on the way to the Geysirs, *H.* Between Kinnæstadir and Grimstadir, *T. & G.* Geysirs, *M.* Reykum, Olid, Elverid, *St.* Abundant in the eastern part of the Island, *G.*

181. CALLUNA VULGARIS, *Salisb.—K.*

Common.

182. ERICA TETRALIX, *Linn.—G.*

Lava districts, *B. G.* (?).

Gliemann records it on the authority of Mörck. Vahl considers it certainly a native.

[*E. cinerea*, Linn., is included by Solander in a list of plants seen at Granfell. Mörck states that it is to be found in various places.]

183. AZALEA PROCUMBENS, *Linn.—K.*

In many places. Abundant in the south, but rarer in the west, *Mk.*

I have seen it from Oskjuhlid near Reykjavik, and Seythisfjord, and Skagafjord, *Sy.*

184. RHODODENDRON LAPPONICUM, *Wg.—V.*
Kalmanstunga, *B. G.*
Vahl records it as a certain native.

185. LEDUM PALUSTRE, *Linn.—V.*
Steenstrup found this in Iceland, but I do not know the exact locality.

[Vahl considers *Ledum latifolium* certainly a native.]

186. VACCINIUM MYRTILLUS, *Linn.—K.*
Hafnarfjord, *S.* Thingvellir, Voxhuur, Gronnfjord, *Mk.* Siglufjord, *T. & G.* Skagafjord, *Sy.*!

187. V. ULIGINOSUM, *Linn.—K.*
Reykjavik, Reinevalla-hals, Thingvellir, *B.* Granfell, *S.* Hekla, *Ld.* Siglufjord and Eyafjord, *T. & G.* Hafnarfjord, *L.*! Skjalfanda, *B. G.* Breid-dals-heidi, *Hd.* Seythisfjord, Skagafjord, *Sy.*! Okid, Olverind, Thingvellir, Reykir, *St.*

β. PUBESCENS, *Wormlsk.*
Reykhollar, *St.*

188. V. VITIS-IDÆA, *Linn.—G.*
Bogs near Uxahver, *B. G.*!

189. V. OXYCOCCOS, *Linn.—K.*
Bogs near Uxahver, *B. G.*

190. PYROLA MEDIA, *Sw.—K.*
By Oxnahver, and in several places near Myvatn, by Spakonufel above the factory at Skagastrand, *M.* Hafnarfjordrhaun, and Seythisfjord, *Sy.*!

B. G. found it, but has lost the note of the exact spot.

P. rotundifolia, 'Fl. Dan.' t. 110, is *P. media*, which is therefore the plant of Mohr; for he quotes that plate as his *P. rotundifolia*. Vahl records *P. rotundifolia*, but does not notice *P. media*. It is probable that all the authors refer to the same plant, which, under the name of *P. rotundifolia*, has had a place in the lists from the time of König (1770), long before the description of *P. media* by Swartz in 1804.

191. P. MINOR, *Linn.—S., G.*
Thingvellir, Reinevalla-hals, *B.* A little beyond Hrafnagja on the way to the Geysirs, *H.* Rangarvalla, Gronnefjord, *Ld.* Hafnarfjordrhaun, *Sy.*!

192. P. SECUNDA, *Linn.*—*K.*
Briamsloek, *St.*

[MONOTROPA HYPOPITYS, *Linn.*—*S.*
Solander states that he saw it in Paulsen's herbarium. I fear that there has been some mistake.]

[GENTIANA VERNA, *Linn.*—*M.*
By Reykelaug, on the authority of Olafsen (p. 201), G.
A very unlikely plant to have been found. According to Fries it is not known in Scandinavia.]

193. G. DETONSA, *Fries.*—*K.*
G. ciliata and *G. bavarica* of Zoega's Flora are probably this plant.
It is figured in 'Fl. Dan.' t. 317.
Bessested and Ness, *Z.* Near the snow-line on Snaefellsjokul, *Mk.* Holar and Hvita, *B. G.* !

194. G. INVOLUCRATA, *Fries.*—*Z.*
G. aurea, Linn. ?, *G. quinquefolia*, Zoega, 'Fl. Dan.' 344.
Orebakka, Bessested, Rangervalla, Hliderendi, *S.* ! Hvalsa by Hrutafjord, *M.* Olafsvik, *Mk.* Sandlingsdal, Gronahlid, Thingmannaheidi, Latrum, Sletta, *St.*

195. G. NIVALIS, *Linn.*—*K.*
Geysirs, *B.* Krisuvik, *Z.* Steinhold, Leirknukr, *Hd.* Holar, *B. G.* Near Holmar on Reydarfjord, near Kinnæstadr, *T. & G.* Olafsdal, *St.* Logbergat, Thingvellir, Blanda, *K.*

196. G. CAMPESTRIS, *Linn.*—*K.*
Reykjavik, *B.* Berufjord, Selsund, *Hd.* ! Skagastrand, *G.* Hvita, Hlitharfjall, *B. G.* Skagafjord, Melifell, Hjaltadal, *Kr.* Stadarfell, *St.* Seythisfjord, *Sy.*

197. G. AMARELLA, *Linn.*—*K.*
Selsund, Steinholt, Hraun, *Hd.* ! Hafnarfjord, *S.* ! Holar, *B. G.* Siglufjord, near Holmar on Reydarfjord, *T. & G.* Sletta, Latrum, Adelvik, *St.* Oefjord, *Kr.*
This is probably the *G. autumnalis* of P. & Z.

198. G. TENELLA, *Fries.*—*K.*
'Fl. Dan.' t. 318.
In dry meadows at Bessested and Hlidarende, *Z.* Leiraa, *Mk.* Bramslœk, Latrum, Adelvik, *St.* Myvatn, *Kr.* Siglufjord, *T. & G.*
It is in Solander's collection as *G. Œderi*, an unpublished name, and without any locality.
Hooker thought it might be the *Cicendia filiformis*, which does not extend so far towards the north.
[*G. Pneumonanthe* (Linn.) is enumerated by P. & Z.]

199. Pleurogyne rotata, *Griseb.*—*K.*
Swertia sulcata, *Rottb.*
S. rotata, *Linn.*
'Fl. Dan.' t. 343.
Between Reykjavik and Thingvellir, *Mk.* Oefjord, *Kr.* Modrudal, Arnarvatnsheidi, *Hd.*! By Odde, not far from Oerebakke, at Bolfjald near Hekla, *Z.* Hellam, Sellsund, Eigvindersmull, *S.*

200. Menyanthes trifoliata, *Linn.*—*K.*
Common. Laxarvogr in Hvalfjord, *B.* Hafnarfjord, *S.*! Vithimyr, *B. G.*! Reykjavik, *Sy.*! Seythisfjord and Skagafjord, *Sy.*

[Benguerel records *Villarsia nymphæoides*, but gives no locality for it, and he has probably made a mistake.]

201. Diapensia lapponica, *Linn.*—*G.*
Stadarstad, *Mk.* In the ravine at about halfway from Reykjavik to Thingvellir, *Sy.* (Faroe and Iceland, 74).

202. Echium vulgare, *Linn.*—*M.*
Solander saw a specimen in Paulsen's herbarium. Hjaltalin and Gliemann, as well as Mohr, recognize it as an Icelandic plant.

203. Mertensia maritima, *Gray.*—*K.*
Reykjavik, *B.* Oelvesoa, *Z.* Myvatn, *T.* & *G.* Voxhuus, *Mk.* Esjostrand by Mogilsa, *St.* Oerebakka, *Kr.* Seythisfjord, *Sy.*

204. Myosotis palustris, *With.*—*K.*
Hafnarfjord, Granfell, *S.* Hof in Vatnsdal, *B. G.*

205. M. arvensis, *Lehm.*—*S.*, *M.*
M. intermedia, *Link.*
Reykjavik, *B.* Akreyri, *C.*! Raud nef stadr, *Hd.* Laugarvatn, Seidesfjord, Skagafjord, *Sy.*!

206. M. versicolor, *Rehb.*—*G.*
Reykjavik, *B.*
Gliemann enumerated it on the authority of Mörck.

[M. collina, *Hoffm.*—*L.*
Lindsay and Preyer & Zirkel enumerate this without any locality. I recorded it in Holland's List by mistake. Holland's plant was *M. arvensis.*]

207. M. stricta, *Link.*—*St.*
Stadarfell, Stikkesholm, *St.*

208. Digitalis purpurea, *Linn.*—*Hornemann.*
An Icelandic specimen is in the Horn. Herb. at Copenhagen which was gathered by Brynjulfsson, *Lange.*

209. Limosella aquatica, *Linn.—K.*

Laugarvatn, *Z.* Fjallehaekkeveien, *St.* Berufjord, *Thienemann* in Herb. Horn.

210. Pedicularis Œderi, *Vahl, Fries.—K.*

Krafle, Myvatn, *Z.* Not rare according to *G.* Geitarhlid, *Mk.* Briamsloek, Olid, Garpsdal, *St.* Grimstungaheidi, *Kr.* Above Akreyri, *C.*!

It seems nearly certain that this is the true name of our plant. It is the *P. versicolor* of Wahlenberg in his 'Fl. Suec.,' but not in his 'Fl. Helv.'; and is the *P. flammea* of 'Fl. Dan.' t. 30, and the Icelandic Floras.

211. P. palustris, *Linn.—G.*

Mikliboer, *B. G.*

212. P. sylvatica, *Linn.—K.*

Hafnarfjord, Molar, *S.* Lagarfljot, *G.*

According to B. G. this is a common plant.

213. Rhinanthus Crista-galli, *Linn.—K.*

R. minor, *Ehrh.*

Reykjavik, *B.* Raudnefstadr, Knappavellir, *Hd.* Geysirs, *B. G.* Sletta, Kollafjordarstrand, *St.* Seythisfjord, Skagafjord, *Sy.*!

There is a specimen in Solander's collection.

Preyer and Zirkel also record *R. major*, Ehrh.

214. Bartsia alpina, *Linn.—K.*

Laxarvogr in Hvalfjord, *B.* Hafnarfjord, Granfell, *S.* Gestarlhid, near Krisuvik, *Mk.* Reykjavik, between Kalmanstunga and Thingvellir, *Kr.* Husavik, Siglufjord, *T. & G.* Eyafjord, *C.*! Skjalfanda, *B.G.* Seythisfjord, Skagafjord, *Sy.*!

215. Euphrasia officinalis, *Linn.—K.*

E. parviflora, *Fr.*

Olafsvik, *Mk.* Bessested, *Kr.* Breiddalsheidi, Utsalir, *Hd.*! Hafnarfjord, *S.* Thingvellir, *Sy.*! Grimstunga, *B. G.*

Two plants are recorded by Gliemann under the names of *E. danica* and *E. hirsuta*, on the authority of Hooker. No such names appear in Hooker's catalogues, nor have I any idea of what plants are meant.

[Veronica peregrina, *Linn.—K.*

If this plant of temperate North America was found by König, it must have been accidentally introduced. But probably there was some mistake. No locality is recorded. All the authors, except Vahl, follow König.]

[V. SPICATA, *Linn.*—*P. & Z.*
This is very unlikely to be a native.]

[V. ANAGALLIS, *Linn.*—*K.*
Vahl doubts if this plant has really been found. It is enumerated in all the lists without any doubt. I have not seen any specimen, and do not know of any locality for it. It does not occur in Lapland, nor in the arctic regions, and therefore I venture to propose its omission.]

[Benquerel records *V. aquatica*, of which I know nothing.]

216. V. SCUTELLATA, *Linn.*—*K.*
Hafnarfjord, *S.*

217. V. BECCABUNGA, *Linn.*—*K.*
Abundant near Skagastrand, and other places in Hunavatns Syssel, *M.* Frequent in the north, *G.* Thingvellir, *Sy.*! Reykum, *St.*

218. V. OFFICINALIS, *Linn.*—*K.*
'Fl. Dan.' 570.
Hafnarfjord, *S.* Common in the west and south, *Mk.* Seythisfjord, Hafnarfjordshraun, *Sy.*! Stadarfell, Olafsdal, Glamaheidi, *St.*

219. V. SAXATILIS, *Linn.*—*K.*
V. fruticosa, *K.*, &c.
Oxeraa, Grimmans Fiadle, Reikium Fiadle, Torfa Jokul, *Z.* Thingvellir, Sweinascaur, *H.* Reykjavik, *B.* Eyafjord, *C.* Myvatn and many other places in Mule Syssel, *M.* Eydar on the Lagarfljot, *T. & G.* Myvatn, *G.* Hredavatn, Olid, *St.* Ascends to the height of 2000 feet in the west, *Mk.*

220. V. ALPINA, *Linn.*—*K.*
Reynivalla-hals, *B.* By a mountain-stream above Akreyri, *C.*! Hallormstadrhals, Breiddalsheidi, *Hd.*! Uxahver, Skjalfanda, *B. G.* Skagafjord, *Sy.*! Myvatn, *T. & G.* Bitrufjord, Reykjarfjord, *M.* Krisuvik, *St.* Oxnedalsheidi, *Kr.*

Gliemann says that it is common in the north, and Mörck that it reaches the height of 2000 feet in the west.

221. V. SERPYLLIFOLIA, *Linn.*—*K.*
Reykjavik, *B.* Hafnarfjord, *S.* Grenjatharstadr, Holar, *B. G.* Abundant near Skagastrand, and at other places in Hunavatns Syssel, *M.* Seythisfjord, Skagafjord, *Sy.*! Common in Bogarfjord Syssel, rarer in Snaefells Syssel, *Mk.* Gardir, *Kr.*

222. THYMUS SERPYLLUM, *Linn.*, *Fries.*—*K.*
Reykjavik, *B.* Hafnarfjord, *S.* Middalr in Strande Syssel, *Olufsen and Povelsen.* Keflavik, *Mk.* Geysir, *Kr.* Breiddalsheidi, Mikliboer,

Hd. Lagarfljot, *G.* Oxnardalr, *B. G.*! Seythisfjord, Skagafjord, *Sy.*!

223. PRUNELLA VULGARIS, *Linn.—K.*
Laugarness near Reykjavik, *B.* Myvatn, *M.* Near the south coast, *Ld.*! Kalmanstunga, Arnarvatn, *B. G.* Seythisfjord, *Sy.*!

224. LAMIUM AMPLEXICAULE, *Linn.—V.*
Iceland, *St.*

There is a specimen in the Herb. at Copenhagen.

225. L. PURPUREUM, *Linn.—K.*
Geysir, *S.* Hnausir, *B. G.*

226. L. ALBUM, *Linn.—Hj.*
Hnausir, *B. G.*

227. GALEOPSIS LADANUM, *Linn.—K.*
'Fl. Dan.' t. 1757.

This is recorded in König's Flora, and all except Vahl have followed him. I find no localities recorded for it.

228. G. TETRAHIT, *Linn.—K.*
Geysirs, *B.* Skalholt, *S.* Reykjavik, *Sy.*! Holar, *B. G.*

229. STACHYS SYLVATICA, *Linn.—G.*
Fnjorhadalr, *B. G.*

Gliemann enumerates this plant without remark; but none of the other lists include it.

230. PINGUICULA VULGARIS, *Linn.—K.*
Reykjavik, Garde Hraun, *B.* Hafnarfjord, *S.* Myvatn, Arnarvatn, *T. & G.*! Selsund, Steinholt, Raudnefstadr, Knappavellir, *Hd.*

231. P. ALPINA, *Linn.—M.*
Found at Borgarfjord by Petersen, *M.*

Baring-Gould's *P. alpina* from Arnarvatn (!) is *P. vulgaris* with the scape more glandular than is usual, and the plant small.

232. PRIMULA FARINOSA, *Linn.—M.*
Crossnaes, *G.*

233. P. STRICTA, *Horn.—G.*
Eyjafjord, *T. & G.*, who call it *P. Hornemanni.*

[LYSIMACHIA NUMMULARIA, *Linn.—S.*

Solander saw it in Paulsen's herbarium. No other author mentions it.]

[ANAGALLIS ARVENSIS, *Linn.—S.*

Solander saw it in Paulsen's herbarium. No other author mentions it.]

234. **TRIENTALIS EUROPÆA**, *Linn.—Hj.*

Eydar on the Lagarfljot, *T. & G.*

The late M. J. Gay informed me that there is a specimen from Stykkisholmar by Breithifjord in the Paris Herb.

235. **GLAUX MARITIMA**, *Linn.—M.*

Eyjafjord, Mithfjord, *B. G.*

236. **ARMERIA MARITIMA**, *Willd.—K.*

A. pubigera β. scotica, *Bois.*

Common from the coast to the dry sands of the interior and up to the perpetual snow. My specimens from Reykjavik, and Symington's from Skagafjord, are the above-named plant of Boissier; but probably other forms are to be found.

237. **PLANTAGO MAJOR**, *Linn.—K.*

Geysirs, *B.* Hafnarfjord, *S.*! Laugarnes, Seythisfjord, *Sy.*!

[**P. MEDIA**, *Linn.—L.*

Lindsay and Preyer & Zirkel enumerate this plant. I have much doubt concerning it.]

238. **P. LANCEOLATA**, *Linn.—K.*

Sandlaugsdal, *St.*

Gliemann says that it is very common.

239. **P. ALPINA**, *Linn.* (?)—*H.*

Thingvellir in plenty, *H.* (who has specimens).

Robert gives Iceland as a locality for it in DC. Prod. (xiii. i. 731). Gliemann thought the plant is probably *P. maritima*, var. *glauca*. Specimens are in Hornemann's herbarium at Copenhagen; and Lange considers that they are an undescribed species, which he purposes to publish in 'Fl. Dan.' with the name of *P. borealis*.

[**P. CORONOPUS**, *Linn.—K.*

König recorded this plant; and all, except Vahl, have followed him without doubt. It certainly requires confirmation.]

[**LITTORELLA LACUSTRIS**, *Linn—S.*

There is a specimen of this, but without any locality, amongst Solander's Icelandic plants in the British Museum. But that is scarcely sufficient authority for adding it to the flora.]

240. **CHENOPODIUM ALBUM**, *Linn.—G.*

Brethedal, *St.*

[**ATRIPLEX HORTENSIS**, *Linn.—G.*

Gliemann added this on the authority of Olafsen (p. 333).

Fries considers it a real native of Lapland and Finland. Can it have resulted from an attempt at cultivation?]

241. A. HASTATA, *Linn.*—*K.*
A. patula, *Sm.*
Reykjavik, *B.*

242. A. ANGUSTIFOLIA, *Sm.*—*S.*
A. patula, *Linn.* (?), *Koch*, *Fries.*
Stadarfell, Bredehollir, *St.*

There is a specimen in Solander's collection, which seems to have grown on very rich soil.

243. A. BABINGTONII, *Woods.*—*K.*
A. rosea, *Bab., not Linn.* A. crassifolia, *Fr., not Mey.* A laciniata, *Zoega* and most Icelandic botanists.
Rodefjord, *G.*

An Icelandic specimen from Hjaltalin is in Hornem. Herb. at Copenhagen.

[RUMEX CONGLOMERATUS, *Murr.*—*K.*
R. acutus, *K. &c.*

This is a common plant, according to Gliemann. He also records *R. domesticus*, or I should have suspected that he, and all the older Icelandic botanists, really intended the *R. domesticus* by *R. acutus*, and that *R. conglomeratus* is not to be found in Iceland. If really common, it is remarkable that no recent visitors have noticed it. I have no recollection of seeing any plant at all like *R. conglomeratus.*]

244. R. DOMESTICUS, *Hn.* (?)—*G.*
Reykjavik, *B.* Budnestad, *Mk.* Reykhollar, *St.* Found especially at Borgarfjord, according to Olafsen and Povelsen, who call it *Patientia or Lapathum.*

I am unable to determine to which of the species into which the *R. aquaticus* (Linn.) is now divided, my specimen ought to be referred; but it seems to be *R. domesticus.* The specimens gathered by Mörck and by Steenstrup, now at Copenhagen, are so named. Becquerel adds *R. crispus*, but probably means the same plant. Preyer and Zirkel record *R. crispus* and *R. Patientia*; but probably both names refer to the same plant. There is a probable specimen of *R. domesticus* in Solander's collection, but it has no leaves. Gliemann states, on the authority of Mörck, that *R. domesticus* is the plant of Iceland; and Vahl admits it as a native species.

245. R. **Acetosa**, *Linn.—K.*

This is a common plant. I have seen it from Reykjavik, *B.* Breiddalsheidi, *Hd.* Hafnarfjord, *S.* Steinstadr in Oxnadalr, *B. G.* Seythisfjord, *Sy.*

246. R. **Acetosella**, *Linn.—K.*

Common. I have seen it from Reykjavik, *B.*, and Steinstadr, *B. G.*

247. **Oxyria reniformis**, *Hook.—K.*

Reykjavik, *B.* Stappen, *Mk.* Besserstad, *Kr.* Siglufjord, *T. & G.* Breiddalsheidi, *Hd.* Grimstunga, *B. G.* Saudarey (Suthrey) in Breithjfjord, *Robert.* Olafsfjord, *G.* Skagafjord, *Sy.*!

248. **Polygonum viviparum**, *Linn.—K.*

Reykjavik, *B.* In great abundance at Thingvellir, *H.* Akreyri, Hallorm-stadr-Hals, at the foot of Orœfa Jokull, near Myvatn, *Hd.* Hafnarfjord, *S.*! Holar, *B. G.* Seythisfjord, Skagafjord, *Sy.*

I have received specimens of it named *P. Bistorta.*

[P. **Bistorta**, *Linn.—H.*

A very doubtful native.]

249. P. **amphibium**, *Linn.—K.*

In all the lists. I have no knowledge of its localities.

250. P. **Persicaria**, *Linn.—K.*

In all the lists. I have no knowledge of its localities.

251. P. **lapathifolium**, *Linn.—St.*

Steenstrup deposited an Icelandic specimen in the Herbarium at Copenhagen.

252. P. **Hydropiper**, *Linn.—K.*

In all the lists. I have no knowledge of its localities.

Vahl had doubts concerning this plant and the two preceding being natives.

253. P. **aviculare**, *Linn.*

Common. I have seen it from Thingvellir and the Geysirs, *R.* Akreyri, *C.*! Reykjavik, Skagafjord, and Seythisfjord, *Sy.*!

Lange says that forms *angustifolium* and *latifolium* are in the Herbarium at Copenhagen.

[P. **Convolvulus**, *Linn.—G.*

I know nothing of this, and it is not noticed by others.]

254. **Kœnigia islandica**, *Linn.—K.*

Reykjavik, *B.* Geysirs and north foot of Laugerfell and Skalholt, *H. & B. G.* Bessested, *Sir J. Banks in Brit. Mus. Herb.* Rangarvellir, *Mk.* Skagafjord, *M.* Stadarfell, *St.* Oefjord, *Kr.* Myvatn, *T. & G.* Ness, Esia, Reikium, Nupterfjal, Oerebakka, Hliderendi, Holte, *S.*

Discovered in Iceland (on clayey ground at Ness, *Z.*) by J. G. König in A.D. 1765 (*Linn. Mantis.* 35).

255. EMPETRUM NIGRUM, *Linn.—K.*

Reykjavik, *B.* Hafnarfjord, Granfell, *S.* Siglufjord, Eyafjord, *T. & G.* Oræfa Jokull, near Myvatn, *Hd.*

"Used by Bishop Päl for making sacramental wine. Päl's Saga, cap. ix." *B. G.*

[EUPHORBIA PEPLUS, *Linn.—S.*

Solander saw this in Paulsen's herbarium. A possible but not probable native.]

256. CERATOPHYLLUM DEMERSUM, *Linn.—K.*

In all the lists. I know of no localities.

257. URTICA URENS, *Linn.—K.*

Reykjavik, *B.* Eyjafjord, *B. G.* Skagafjord, *Sy.* !

It grows about the houses at Reykjavik, and was probably introduced. Solander saw it in 1772; but Mohr took no notice of it in 1786. Hooker observed it in 1811, and I saw it in 1848.

258. U. DIOICA, *Linn.—K.*

Kalfanes in Steingrimsfjord, *Paulsen in M.* Vatns-skarth, *B. G.*

Olafsen and Povelsen say that *U. minor* ("Brenn-nessel") grew on Flatey in Breidifjord. I believe that they meant *U. dioica*, which seems to be the Brennu-netla of Iceland, and is the Brannatsla of Sweden.

259. CALLITRICHE VERNA, *Linn.—K.*

Hafnarfjord, *S.* Reykjavik. *St.*

260. C. STAGNALIS, *Scop.—St.*

Reykholt, *St.*

261. C. AUTUMNALIS, *Linn.—K.*

Included in all the lists. I know of no localities.

262. BETULA NANA, *Linn.—K.*

Thingvellir, *B.* Kreisuvik, *H.* Eylifr, Vithidal, Myvatn, *B. G.* Eyafjord, *T. & G.* Skagafjord, *Sy.* !

263. B. INTERMEDIA, *Thom.* (*in Rchb. Fl. Excurs.*).

B. alba β. procumbens, *Sol. MS.* B. fruticosa, *Vahl.*

Abundant near Thingvellir, *B.* Stadarstad, *M.*

This appears to be the *B. alba* of Zoega, which, he says, formed a wood at Laugervatn. He states that the trees were mostly decumbent, and had stems 4 ells long, and 4 inches thick.

I have failed in identifying my plant with those of other authors. It is often mistaken for *B. alpestris* (Fr.), or *B. humilis* (Schr.); but the shape of its leaves and of the scales of its catkins is different from what it is in those plants. *B. alpestris* (Fr.), *B. humilis* of his Herb. Norm. v. 60, has:—"foliis subrotundis obtuse serratis, amentis terminalibus erectis pedunculo amentum subæquante, squamis digitato-trifidis laciniis distantibus porrectis subæqualibus." *B. humilis* (Schrank), Fries, Herb. Norm. xiii. 72, has:—"foliis subrotundo-ovatis (sæpe basi subcordatis) acute crenato-serratis, amentis terminalibus erectis breviter pedunculatis pedunculo multo longioribus, squamis digitato-trifidis laciniis divergentibus subæqualibus."

My plant may be described as follows:—

B. foliis rhomboideo-ovatis irregulariter acute crenato-serratis basi cuneatis integris, petiolis pubescentibus, amentis terminalibus erectis pedunculatis pedunculo amentum subæquante, squamis trifidis *laciniis* ciliatis latis apice rotundatis *intermedio lateralibus paululum incumbentibus,* nucibus obovatis ala cinctis latitudinem nucis æquante apicemque pilosam vix attingente.

264. B. GLUTINOSA, *Fries.*—G.

B. alba of all the lists.

Thingvellir, *B.* Granfell, *S.* Fnijoska-dalr, Northar-dalr, &c., *B. G.* Skagafjord, *Sy.*!

As far as I can learn, there is only one kind of Birch-tree in Iceland; for the preceding species are shrubs. It is usually called *B. alba,* because the older botanists did not distinguish *B. glutinosa* from the Linnæan species. I saw one small tree of *B. glutinosa* in the Almannagja, and obtained specimens of the leaves from it; nor have I seen any other.

The Birch was formerly much more abundant than it is at present. Horrebow states that the wood in Fnijoskadalr was four miles long and half a mile wide at about the middle of the eighteenth century. Gliemann states that in 1824 only stumps and decaying stems remained there, and that some of these stumps were of considerable thickness. This fine wood was destroyed by the improvident conduct of the people. Henderson states that he saw, in 1814, the remains of this forest on the east side of the river, consisting of numerous stumps of Birch trees, some of which exceeded 2 feet in diameter. My friend Mr. E. Magnüsson informs me that it has now renewed itself to some extent, and with ordinary care may again become a valuable forest.

Gliemann informs us that to the east of Reykjalid, at the foot of Dalefjord, and by Ferjubakki, near the mouth of the river Jokulsa of Axarfjord, there were high and thick Birch trees remaining.

Sir G. S. Mackenzie passed in 1810 through a wood of Birch trees, 6–10 feet high, by the Hvita of Bogarfjord. Hooker, in 1811, passed through a similar "forest" of these trees, some 11–12 feet high, near the south side of the entrance of Bogarfjord. And Henderson, 1814–15, saw "numerous forests of birch," by the Lagarfljot.

265. SALIX PENTANDRA, *Linn.—K.*
Thingvellir, *B. G.*

S. ambigua, Ehrh. (*S. versifolia* of Gliemann) is probably a mistake.

266. S. PURPUREA, *Linn.—G.*
Thingvellir, *B. G.*

267. S. LANATA, *Linn.—K.*
Thingvellir, *B.* Eyafjord, *T. & G.* Granbakka, Stikkesholm, Budnesstadt, *Mk.* Grimstungaheidi, Arnesvatn, *Kr.*

It is remarkable that this plant is omitted by P. & Z., and also by B. G.

268. S. OVATA, *Ser.*
Reykjavik, *Kr.*

269. S. LAPPONUM, *Linn.—K.*
Eyafjord, *T. & G.*

270. S. ARENARIA, *Linn.—K.*
Vahl-fjord, *B.* Leiruvatn, *B. G.*

Gliemann states that it is not uncommon.

271. S. CAPREA, *Linn.—K.*
On the east side of the head of Eyjafjord, *M.* Seljadal, *B. G.*

272. S. PHYLICIFOLIA, *Linn.—B.*
Thingvellir, *B.* Voxhuus, *Mk.* Myvatn, *Kr.*

273. S. CINEREA, *Linn.—P. & Z.*
Ljosavatn, *B. G.*

I have some doubt of the correctness of the name, and have not seen any specimen.

[S. GLABRA, *Scop., Ledeb., Koch.—Hj.*

Hjaltalin includes this, but probably by mistake. It is said to have been found at Kola in Lapland, but not in Scandinavia.]

274. S. MYRTILLOIDES, *Linn.—K.*
Hafnarfjord, *S.*

275. S. REPENS, *Linn.—K.*
Eylifr, Ljosvatn, *B. G.*

276. S. GLAUCA, *Linn.*, not of *Sm.—K.*
Reinevalla-hals, *B.* Torrent near Eyjafjord, and between Thingvellir and the Geysirs, *C.*! Head of Leiravatn, *B. G.* Skagafjord, *Sy.*!

Apparently Lindsay combines this plant with the *S. Lapponum* of Linnæus; but it is the *S. glauca* of Smith, which belongs to that species. This is the *S. arenaria* of the 'Flora Danica,' and is probably the *S. arctica* (R. Br.).

277. S. ARCTICA, *Pall.—Robert.*

It grew on the old church at Thingvellir, and, according to E. Robert (Voy. 340), had a stem 6 feet long.

278. S. MYRSINITES, *Linn.—K.*
Hafnarfjord, *S.*

279. S. ARBUSCULA, *Linn.—K.*
Eyafjord, *T. & G.*

280. S. PYRENAICA, var. NORVEGICA, *Fr.—B.*
S. alpestris, *And.*?
Reinevalla-hals, *B.*

It is possible that this plant is included under the name of *S. Myrsinites* in the lists.

281. S. RETICULATA, *Linn.—K.*
Olafsvik, *Mk.*

Gliemann states that this plant is moderately frequent.

282. S. HERBACEA, *Linn.—K.*
Thingvellir, Reykjavik, Reinevalla-hals, *B.* Skoulafjeld, *H.* Hafnarfjord, *S.*! Breiddalsheidi, *Hd.* Akreyri, *C.* Grimstungaheidi, *Kr.* Skagafjord, *Sy.*!

283. JUNIPERUS NANA, *Willd.—K.*
Hafnarfjord, *S.*! Myvatn, *G.* To the west of Skjaldbreid, *Hd.* Arnarvatn, Grjot-hals, *B. G.* Skagafjord, *Sy*!

This plant is recorded by König and all succeeding authors under the name of *J. communis* or *J. nana.* Some few late writers include both names; but Robert tells us that *J. nana* is the only coniferous plant to be found in Iceland; and Vahl confirms him. Mörck considered *J. communis* to be a common plant; but I am informed that there is no specimen of the species in the Museum at Copenhagen.

[*Pinus sylvestris* and *Abies Europæa* have been planted and also sown, but they do not long survive the rigour of the climate. Hooker was told that a single dwarf tree of *P. sylvestris* grew on an island in a lake which he passed between the head of Borgarfjord and Reyholt (*Hook. Tour*, i. 306).]

284. **PARIS QUADRIFOLIA**, *Linn.*—*K.*
Hafnarfjord, *S.*! & *Sy.*! Seythisfjord, *Sy.*! Skaptafells-Syssel, *G.*

285. **ORCHIS MORIO**, *Linn.*—*K.*
Grimstunga, *B. G.*

286. **O. MASCULA**, *Linn.*—*K.*
Hafnarfjord, *S.* On the way to Krisuvig, *H.*

287. **O. MACULATA**, *Linn.*—*K.*
Hafnarfjord, *S.* Geysirs, *B.* Steinstadr, *B. G.*! Thingvellir, *St.* Seythisfjord and Hafnarfjordhraun, *Sy.*!

288. **O. LATIFOLIA**, *Linn.*—*K.*
I have not seen any specimen. The *O. latifolia* of my list is apparently *O. maculata.*

289. **O. CRUENTA**, *Müll., Fries.*—*G.*
Gliemann introduced this plant on the authority of Mörck, who found it at Rangarvalla. It is figured on tab. 876 of the 'Fl. Danica.' Fries considers it very closely allied to *O. incarnata*, but distinguished by its "foliis excurvis subfalcatis."

290. **PLATANTHERA HYPERBOREA**, *Lindl.*—*K.*
Geysirs, *B.* Oxeraa, *S.* Bessested, Ness, Reykjavik, *Z.* Skagafjord, *Sy.*! Akreyri, *C.*! Holtar, Selsund, Buland, Prestbakki, Steinholt, *Hd.* Knjoskadal, and near Myvatn, *M.*

Pl. Kœnigii is recorded as found by Mörck at Geitarhlid, and by Krabbe in Hunavatn-Syssel; but it is scarcely a variety of *Pl. hyperborea.*

291. **HABENARIA VIRIDIS**, *R. Br.*—*K.*
Geysirs, *B.* Akreyri, *C.* At the opening of Horgasdal, *B. G.*! Geitarlhid, *Mk.* Hredavatn, *St.*

292. **H. ALBIDA**, *R. Br.*—*K.*
Akreyri, *C.*! At the opening of Horgasdal, *B. G.* Myvatn, *T. & G.* Stappen, *Mk.* Hredavatn, *St.*

293. **Listera ovata**, *R. Br.—H.*

Found by Mr. Paulsen at Vik, according to Hooker, who has a specimen.

Vahl also marks it as certainly a native plant.

294. **L. cordata**, *R. Br.—St.*

Steenstrup gathered this in Iceland, and there is a specimen in the Museum at Copenhagen.

295. **Neottia Nidus-avis**, *Linn.—K.?*

Hjaltalin and Gliemann record this plant. Hooker received a specimen of "either this or a new species" from Sir G. Mackenzie. Reichenbach, the younger, has seen one from "Islandia austr., *fide* Thienemann." König records *N. kamtschatea*, and Gliemann includes it in addition to *N. Nidus-avis*. Zoega and Solander insert *N. kamtschatea* doubtfully.

In all probability they all refer to the same species, *N. Nidus-avis*.

296. **Nigritella nigra**, *Rchb.—K.*

Recorded in all the lists.

297. **Corallorrhiza innata**, *R. Br.—G.*

Fnjoskadal, *M.* Laugarvatn, *B. G.!* Skagafjord, *Sg.!*

Mohr thought that this was the plant intended by the *Ophrys kamtschatea* of König.

[**Anthericum ramosum**, *Linn.—B.*

An unlikely plant; but Gliemann recorded it without remark, and Hjaltalin retained it.]

298. **Maianthemum bifolium**, *DC.—M.*

It is in most of the lists, and not an unlikely plant. Mohr and Gliemann called it *Convallaria monophylla*, and it is figured under that name in the 'Fl. Danica,' t. 291.

299. **Juncus effusus**, *Linn.—K.*

Reykjavik and Eyjafjord, *B. G.*

Lindsay adds *J. conglomeratus*; and Baring-Gould includes both under the name of *J. communis*. Vahl has neither of them.

300. **J. filiformis**, *Linn.—St.*

Reykhollor, Armule, Briamsloek, *St.*

301. **J. balticus**, *Willd.—H.*

A careful examination of my specimens convinces me that the plant is *J. balticus*. I have not seen any specimens of *J. arcticus* from Iceland, and think it probable that specimens of *J. balticus* have received that name from former writers upon this flora, *e. g.* Gliemann, Hjaltalin, Vahl, and Hooker. My specimens have a decidedly branched, although very small, panicle, like that of the Scottish plant, and therefore much resemble *J. arcticus.* I possess one stem bearing the remains of the fruit of the preceding year, which, as far as I can judge, is that of *J. balticus.*

The localities known for either one or the other of these species are:—Reykjavik, *B.* Laugarnes, *S.* Upsalir, *Hd.* Myvatn, *B. G.* Sandlingrdal, *St.* Oefjord, *Kr.* Voxhuus, *M.*

302. J. TRIGLUMIS, *Linn.—K.*
Reykjavik, Geysirs, *B.* Akreyri, *C.*! Hafnarfjord, Granfell, Heckla, *S.*!

303. J. BIGLUMIS, *Linn.—K.*
"Most abundant, forming a considerable part of the herbage near Reykjavik;" *Hooker* (i. 24). Leiraa, *Mk.* Olafrdal, *St.*

The only specimen which I have seen was gathered by Solander. I did not observe it near Reykjavik, and suspect that Hooker's remark, made from memory, was intended to apply to *J. triglumis.*

304. J. CASTANEUS, *Sm.*
Armule, Granahlid, *St.*

305. J. TRIFIDUS, *Linn.—K.*
Geysirs, Reykjavik, *B.* Akreyri, *C.*! Hafnarfjord, Granfell, *S.*! Budnastad, Stadarstad, *Mk.* Sandlaugrdal, Olafrdal, *St.*

306. J. ALPINUS, *Vill.*
Olafrdal, Sletta, Snaefellstrand, *St.*

307. J. LAMPROCARPUS, *Ehrh.—K.*
J. articulatus of Z., K., H., S. *J. alpestris,* of G.
Laugarnes, *S.* Myvatn, *B. G.* Stikkesholm, *Mk.*

308. J. SUPINUS, *Mönch.—M.*
J. articulatus of L.
Geysirs, *B.* Reykholt, *St.*
The Icelandic specimens are very small.

309. J. SQUARROSUS, *Linn.—M.*
Arnarvatn, *B. G.*

310. J. GERARDI, *Lois.—K.*
J. bulbosus of Z., K., H., S. *J. compressus* of L.
Molar, Laugarnes, Geysirs, *S.*

It remains to be determined what is the plant really found in Iceland. Lindsay's *J. compressus* is apparently the aggregate species, including *J. cœnosus* and *J. Gerardi*; that of Vahl is only a supposed native, and therefore of no authority. It is probable that the plant is *J. Gerardi*, as that is the name adopted by P. & Z., who do not enumerate *J. compressus*. There are no specimens of the plant found by Solander in the British Museum.

311. J. BUFONIUS, *Linn.*—*K.*
Geysirs, *B.* Hafnarfjord, Laugarnes, *S.*! Reykholt, *St.*

[*J. Jacquinii* is included in the flora by P. & Z., but it is a very unlikely plant to grow in Iceland.]

312. LUZULA PILOSA, *Willd.*—*K.*
Eyafjord, *T. & G.*

313. L. CAMPESTRIS, *DC.*
There is a specimen at Copenhagen, gathered by Krabbe.

314. L. MULTIFLORA, *Lej.*—*K.*
Reykjavik, Geysirs, Reinevallahals, *B.* Groenahlid, Ovre Glamaheidi, Krisuvik, *St.*

Probably this is the *L. campestris* of most of the lists; for the true *L. campestris* appears to be rare, and replaced, as in other marshy countries, by the *L. multiflora*.

315. L. SPICATA, *DC.*—*K.*
Reykjavik, *B.* Hafnarfjord, Hekla, *S.* Akreyri, *C.* Sletta, Reykholar, *St.*

316. L. ARCUATA, *Hook.*
Mountains near Akreyri, *C.*! Adelvik, Thorisengismule, Okid, Krisuvik, Hredavatn, Sletta, Briamsloek, *St.*

317. "L. CONFUSA, *Lindb.*," *Lange.*—*St.*
L. hyperborea, *Blytt.*
Stromsnesheidi, Sletta, Ovre Glamaheidi, *St.*

"*L. arctica* (Blytt), *L. hyperborea* (Hartm. et Bot. Suec. nec Blytt), non vidi ex Islandia," *Lange.*

318. TOFIELDIA PALUSTRIS, *Huds.*
T. borealis, *Wahl.*
Reykjavik, Laxarvogr, *B.* Myvatn, *T. & G.* Geysirs, *C.*! Akreyri, Breiddalsheidi, *Hd.* Laugarnes, Skagafjord, *Sy.*! Skjalfanda, *B. G.*! Ovre Glamaheidi, *St.* Arnes Syssel, *Kr.*

This is the true *T. palustris* of Hudson, which is a much older name than *T. borealis*, Wahl.

[T. CALYCULATA, *Willd.*

Baring-Gould informs me that he gathered two kinds of *Tofieldia* at Grimestunga, and considers one of them to be this species. I have not seen his specimens. K., & Z. include it in their lists Solander has the name, but his specimen seems to be the *T. palustris.* I have seen other specimens named *T. calyculata* which are *T. palustris.* I doubt if the true plant has ever been found in Iceland.]

319. TRIGLOCHIN PALUSTRE, *Linn.—K.*
Reykjavik, *B.* Hafnarfjord, *S.*! Akreyri, *C.*! Reykholt, *Robert.*

320. T. MARITIMUM, *Linn.—K.*
Reykjavik, Gronnefjord, *Mk.*

321. SPARGANIUM MINIMUM, *Fr.—S.*

My specimen, called *S. natans*, gathered near Reykjavik, appears to belong to this species; but Lange says that the plant found near Reykjavik and at Rangarvalla is the *S. angustifolium* (Mx.), the *S. hyperboreum* (Læstad.).

322. S. NATANS, *Linn.—K.*
Myvatn, *M.*

It is in Solander's collection.

323. POTAMOGETON NATANS, *Linn.—K.*
Laugarnes, *S.* Gronnefjord, *Mk.* Vithimyri, *B. G.*

324. P. RUFESCENS, *Schrad.—G.*
Vithimyri, *B. G.* Laugarnes, *St.*

325. P. NITENS, *Web.*, V. HETEROPHYLLUS, *Fr.*
Reykjavik, *Kr.*

326. P. LANCEOLATUS, *Sm.*
P. nigrescens, *Fries*?
A little to the west of Reykjavik, *B.* Above the hot springs at Laugar near Reykjavik, *B. G.*!

I think that no reasonable doubt can exist of this being the plant of Smith. I have not seen the fruit, nor the floating leaves. It may be the *P. lucens* of Lindsay; for I find that this species is regarded as a form of *P. lucens* by Bentham, whose views are generally adopted by Lindsay.

327. P. HETEROPHYLLUS, *Schreb.*
P. gramineus, *Fries.*
Arnardragur, Laugarnes near Reykjavik, *St.*

328. P. LUCENS, *Linn.—K.*
P. lucidum, *König.*

Hafnarfjord, *S.*

Mörck says that this is a common plant. Vahl doubts its presence in the country; but all the best lists include it.

329. P. PERFOLIATUS, *Linn.*—*M.*
Myvatn, *G.* Sandlaugrdal, *St.*

330. P. CRISPUS, *Linn.*—*K.*
Myvatn, *G.*

All the best lists include it; but Vahl had doubts.

331. P. PUSILLUS, *Linn.*—*K.*
Reykholt, *St.*

Solander saw it in Paulsen's collection.

332. P. PECTINATUS, *Linn.*—*K.*
Laugafjord, *Mk.* Vithimyri, *B. G.*

333. P. FILIFORMIS, *Nolte.*—*K.*
Laxarvogr, *B.* Arnardragur, Sandlangsdal, *St.* Hafnarfjord, *S.* !

K., Z., and S. have a *P. maritimum*; M. and H. put *P. marinum* in its place. They all record *P. pectinatum* in addition. Can their *P. maritimum* be *Zostera marina* (a plant which does not appear in K. or Z. or S., but is recorded by Hooker, and seems to be abundant)?

334. ZOSTERA MARINA, *Linn.*—*S.*
Z. angustifolia, *Rchb.*
Reykjavik, *B.* Hafnarfjord, *S.* Oefjord, in abundance, *G.* Hrutafjord, *B. G.* Stikkesholm, *St.*

The larger form is stated to have been found at Bugafjord by Mörck.

335. BLYSMUS COMPRESSUS, *Panz.*—*K.*
Carex uliginosus, *König.*
Mule Syssel, *G.* Hop, *B. G.*

336. B. RUFUS, *Link.*—*V.*
Hop, *B. G.*

337. SCIRPUS MARITIMUS, *Linn.*
Esia near Reykjavik, *Mk.*

338. S. LACUSTRIS, *Linn.*—*K.*
Reykjavik, *B. G.* Esia, *Mk.*

339. S. PALUSTRIS, *Linn.*—*K.*
Hafnarfjord, *S.* ! Holt, *M.* Reykholt, *St.*

[*S. multicaulis*, Sm., is recorded by Gliemann.]

340. S. UNIGLUMIS, *Link.—B.*
Reykjavik, *B.*

It is probable that this plant was included under the name *S. palustris* by the older authors.

341. S. PAUCIFLORUS, *Light.*
Stadarfell, Reykholar, *St.* Mosfell near Reykjavik, *Kr.*

342. S. CÆSPITOSUS, *Linn.—K.*
Fl. Dan. 167.
Laxarvogr, *B.* Akreyri, *C.* Arnarvatn-heidi, *B. G.*

343. S. ACICULARIS, *Linn.—K.*
There is a specimen, gathered by Steenstrup, at Copenhagen.

344. S. SETACEUS, *Linn.—K.*
Heradsvatn, *B. G.* Hafnarfjord, *S.*

345. ERIOPHORUM ALPINUM, *Linn.—K.*
Reykjavik, *H.* Strande Syssel, *M.* Oxnardals-heidi, *B. G.*

346. E. VAGINATUM, *Linn.—K.*
Hafnafjord, *S.* Eyafjord, *T. & G.* Haugakvisl, *B. G.*

347. E. SCHEUCHZERI, *Hoppe.—S.*
E. capitatum of most of the lists.
Reykjavik, Thingvellir, *B.* Eyafjord, *C.*! Foot of Laugarfell, *H.* Skagafjord, *Sy.*! Vidoe, Krisuvik, *St.* Oefjord, *Kr.*

I incline to the opinion that all the so-called *E. capitatum* of Iceland are *E. Scheuchzeri.*

348. E. POLYSTACHION, *Linn.—K.*
Reykjavik, *B.* Hafnarfjord, Granfell, *S.* Geysirs, Seythisfjord, Skagafjord, *Sy.*! Upsalir, Grimstadr, *Hd.* Eyafjord, *T. & G.* Krisuvik, *St.* Oefjord, *Kr.*

Lindsay also enumerates the *E. angustifolium* (Roth). Other authors mention it, but apparently mean the broad-leaved plant, as they include only one form. I did so in Holland's list.

[*E. triquetrum* (*E. gracile,* Koch) is stated by T. & G. to grow at Eyafjord. I may be permitted to doubt their correctness.]

349. E. LATIFOLIUM, *Hoppe.—V.*
Vahl, Lindsay, and Preyer and Zirkel record this as certainly a native. I know of no recorded localities.

350. KOBRESIA SCIRPINA, *Willd.—S.*
Elyna spicata, *Schk.*; Carex Bellardi, *Hook.*; *Fl. Dan.* 1529.
Geysirs, Thingvellir, Reykjavik, Laxarvogr, *B.* Near Akreyri, *C.*! Hafnarfjord, *Mk.*

351. Carex[*] dioica, *Linn.*—*K.*
Reykjavik, *B.* Reykholt, Borgarfjord, *St.*

352. C. capitata, *Linn.*—*K.*
Hafnarfjord, Reykholt, *St.*

Gliemann adds in brackets "*Scirpus ovatus.*" If he is correct, all the other authors are wrong. I am inclined to believe that the error rests with him. There is a specimen of the true plant in Solander's collection.

353. C. pulicaris, *Linn.*—*K.*

This is included in all the lists without doubt, except that of Vahl.

354. C. rupestris, *All.*—*G.*
Near Stapi by Snaefell Jokul, *Mk.* Akreyri, *C.*!

355. C. microglochin, *Wahlenb.*—*G.*
Reykholt, Borgarfjord, *St.*

P. & Z. add *C. pauciflora* (Lightf.). Probably the only plant found is *C. microglochin*; but *C. pauciflora* is not an unlikely species to occur.

356. C. chordorrhiza, *Ehrh.*—*B.*
Laxarvogr, *B.* Kollafjordasheidi, *St.*

[*C. stenophylla* (Wahl.) is stated by T. & G. to have been found at Siglufjord on the north coast. It is a plant of Arctic America and may really grow in the north of Iceland.]

357. C. arenaria, *Linn.*—*K.*

This is enumerated in all the lists.

358. C. incurva, *Lightf.*—*G.*
Thingvellir, Laxarvogr, *B.*

359. C. vulpina, *Linn.*—*K.*

All, except Vahl, include this in the list as a true native. It does not occur in Lapland or the arctic regions, and is therefore a doubtful plant.

360. C. muricata, *Linn.*—*K.*

The same may be said of this as of *C. vulpina.*

361. C. loliacea, *Linn.*—*K.*

Admitted into all the lists without doubt, except that of Vahl. It is found in Lapland.

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[*] My Icelandic *Carices* were named by the late Dr. Boott.

362. C. ELONGATA, *Linn.—K.*

This also is admitted by all except Vahl. Fries marks it as just entering Lapland.

363. C. STELLULATA, *Gooden.*

Olafrdal, Falknefjord, Stad under Snaefell, *St.*

364. C. CURTA, *Gooden.*

C. canescens of König and some others.

Laxarvogr, *B.* Stappen, *Mk.* Gaspsdal, Armule, *St.*

The plant of M. and St. is named *C. canescens* (Gooden.) by Lange, but is probably this species.

365. C. LAGOPINA, *Wahl.—G.*

Stadarstadt, *Mk.* Stad under Snaefell, Groenahlid, Olafrdal, *St.*

366. C. NORVEGICA, *Wahl.*

Gronefjord, *Mk.*

367. C. OVALIS, *Gooden.—K.*

C. leporina, *Linds.*

All, except Vahl, give this as a true native; but it is rather an unlikely plant.

368. C. CRYPTOCARPA, *Meyer.—B.*

C. filipendula, *Drej.* !

Laxavogr, *B.* Krisuvik, Reykholt, Breidabolstad, Garpsdal, Stad under Snaefel, Grœnahlid, *St.*

369. C. ACUTA, *Linn.—K.*

Gliemann considered it to be a common plant. Vahl doubts its existence; therefore I suppose that the French party did not find it. It is included without any doubt in all the other lists.

370. C. RIGIDA, *Gooden.—M.*

C. saxatilis, *Vahl.*

Reykjavik, Geysirs, Reinevalla-hals, *B.* Akreyri, *C.* ! Breiddalsheidi, *Hd.* Krisuvik, Thorisengismule, Grönahlid, Okid, Breidabolstad, Reykholt, *St.*

β. PUDICA, *Drej.*

Kollafjordarheidi, *St.*

Hj. and G. include both *C. saxatilis* and *C. rigida.*

371. C. HYPERBOREA, *Drej.—B.*

Reykjavik, *B.*

372. C. VULGARIS, *Fries.—S.*

C. cæspitosa, *Drej.*

Reykjavik, Laxarvogr, *B.* Olafsdal, Armule, Krisuvik, Kollafjordarheidi, *St.*

373. C. ANGUILLATA, *Drej.*
Reykholt, *St.*

Fries places this as a variety of *C. aquatilis.*

374. C. VAHLII, *Schk.—G.*
On the mountains near Akreyri, *C.* Kollafjordarheidi, Briamsloek, Groenahlid, *St.*

375. C. ATRATA, *Linn.—K.*
Thingvellir, *B.* Akreyri, *C.*! Rangavalla, *Mk.* Garpsdal, Latrum, Ovre Glamaheidi, *St.*

376. C. PALLESCENS, *Linn.—K.*

Gliemann states that this is common. All except Vahl admit it without doubt.

377. C. PEDATA, *Linn.—K.*

All except Vahl admit this. It is a Lapland plant.

[C. ORNITHOPODA, *Willd.*

Gliemann added this to the list. None of the older authors follow him. Vahl doubts its having been found, and so do I.]

378. C. RARIFLORA, *Sm.—B.*
Laxarvogr, *B.* Geysirs, *Mk.* Krisuvik, Reykholt, Stad under Snaefell, Okid, Olafsdal, Groenahlid, Hafnarfell, *St.*

379. C. LIMOSA, *Linn.*
Reykholt, *St.*

Morck says that it is common.

380. C. IRRIGUA, *Wahl.*
Here and there in Iceland, *Mk.*

381. C. VAGINATA, *Tausch.—K.*
Reykjavik, Laxarvogr, *B.* Leiraa, *Mk.* Stadarfell, Sletta, Hredavatn, Reykholt, *St.*

Lindsay includes *C. panicea* (Linn.) also; and P. & Z. appear to follow him, but exclude *C. vaginata.* Vahl has neither of them. König has *C. panicea,* but probably meant what is now called *C. vaginata.*

382. C. CAPILLARIS, *Linn.—K.*
Reykjavik, *B.* Akreyri, *C.*! Olafsdal, Snaefellstrand, Sletta, Latrum, Groenahlid, Reykholt, *St.*

[C. PILULIFERA, *Linn.—G.*
C. globularis, *König*?

Gliemann records this under the name of *C. montana.* All the other lists (except that of Vahl, which omits both) name *C. montana* and omit *C. pilulifera.* According to Fries neither of the plants so named extends to Lapland. We require specimens to settle this point.]

383. C. FULIGINOSA, *Sternb.—G.*

This rests on the authority of König as quoted by Hornemann, Lange.

It is probable that the *C. nisandra* (R. Br.) is the plant meant by Vahl, which is that of Fries (H. N. v. 80), and of the 'Flora Danica,' t. 2373.

Hj. & G. have also *C. atrofusca,* by which name this plant is probably intended.

384. C. FLAVA, *Linn.—K.*

This is in all the lists. Vahl alone has any doubts concerning it.

[C. DEPAUPERATA, *Gooden.—G.*

Gliemann records this on the authority of Mörck. It is not a likely plant to occur.]

[C. PSEUDO-CYPERUS, *Linn.—K.*

König records this, and nearly all follow him; but Gliemann remarks that it is a doubtful native.]

[C. HIRTA, *Linn.—K.*

This also is included in all the lists except that of Vahl. It seems rather an unlikely plant to be found. In Scandinavia it scarcely extends to the northern part.]

385. C. PULLA, *Gooden.—G.*

Strömsneshlid, Latrum, Armule, Reykholt, *St.*

386. C. AMPULLACEA, *Gooden.—H.*

Gathered by Sir G. Mackenzie, *H.*

A specimen gathered in Iceland by Brynjulfsson is in the Herb. Hornemann.

387. C. VESICARIA, *Linn.—K.*

Included in all the lists.

388. ANTHOXANTHUM ODORATUM, *Linn.—K.*

Reykjavik, *B.* Hafnarfjord, *S.*! Siglufjord, Eyafjord, Eydar on the Lagarfljot, *T. & G.* Skagafjord, *Sy.*!

389. Hierochloe borealis, *R. & S.—K.*

Reykjavik, *Mk.* Briamsloek, Okid, Reykholar, *St.* Hafnarfjord, Thursaholt, *S.*

I do not understand what G. means by *H. glaucus*, introduced on the authority of Hooker. It is clear that he has made some mistake.

390. Phleum pratense, *Linn.—K.*

Laugarvatn, *S.* Reykholar, Olafsdal, *St.*

The form called *P. nodosum* has also been found.

391. P. alpinum, *Linn.*

P. commutatum, *Bab.*

Reinevalla-hals, Geysirs, *B.* Akreyri, *C.* Skagafjord, *Sy.* ! Stappen, *Mk.* Moelefellsdalen in Skagafjord, *Kr.*

392. Alopecurus geniculatus, *Linn.—K.*

Reykjavik, *B.* Common at Rodefjord, *G.* Molar, *S.* Reykholar, Olafsdal, *St.*

[Solander records *Alopecurus* (*Polypogon*) *monspeliensis*. It is an exceedingly unlikely plant to grow in Iceland. There is a specimen of *A. pratensis* in Solander's Icelandic collection, but without any locality. It is a plant not noticed by any other traveller in the island, and was probably a mistake.]

393. Sesleria cærulea, *Ard.—K.*

Fl. Dan. t. 1506.

Lava between Hafnarfjord and Reykjavik, *B.*

394. Nardus stricta, *Linn.—K.*

Hafnarfjord, *Mk.* Olafsdal, *St.*

395. Milium effusum, *Linn.—M.*

Fl. Dan. t. 1144.

Near Kaldrananes, *G.*

396. Phragmites communis, *Trin.—K.*

In all the lists except that of Vahl, who doubts its being a native.

397. Psamma arenaria, *Beauv.—K.*

Near Kinnæstadt, *T. & G.*

398. Calamagrostis stricta, *Nutt.—G.*

Arundo Epigejos stricta, *G.*

Geysirs, Laxarvogr, *B.* Stad under Snaefell, Olafsdal, Grönahlid, Stadarfell, *St.*

It is probable that this is the plant called *Arundo Epigejos* by König and the older authors.

399. C. VARIA. *Vahl.—V.*

Vahl records a plant under this name. It is doubtless the *Agrostis arundinacea* of König, &c., which is usually considered synonymous with *C. montana* (Host), to which the *C. varia* of Wahlenberg is referred. Vahl does not inform us if he intended to refer to *C. varia* of Host (*C. Halleriana*, DC.), or that similarly named by Trinius (*C. montana*, Host).

400. AGROSTIS CANINA, *Linn.—K.*
Olafsdal, *St.*

β. MUTICA, *Hartm.*
Garpsdal, *St.*

401. A. VULGARIS, *Linn.—K.*
A. capillaris, *König.*
Olafsdal, Hafnarfell, *St.*

Mohr records *A. pumila*, which is only a state of *A. vulgaris.*

402. A. ALBA, *Linn.—K.*
A. stolonifera, *Auct.*
Geysirs, *B.* Eydar on the Lagarfljot, *T. & G.* Briamsloek, Olafsdal, Sandlangsdal, Reykholar, Groenahlid, *St.*

[A. ALPINA.

Gliemann records a plant by this name; and Vahl marks it as a native. I cannot determine it.]

403. A. RUBRA, *Linn.—K.*
Eydar on the Lagarfljot, *T. & G.* Olafsdal, Reykholar, Orebakka, *St.*

404. HOLCUS LANATUS, *Linn.—M.*
A little below the Geysirs, *Sy.* !

405. AIRA CÆSPITOSA, *Linn.—K.*
Olafsdal, Garpsdal, *St.* Borgarfjord Syssel, *Kr.* Skagafjord, *Sy.* !

β. PALLIDA *Koch.*
Garpsdal, *St.*

406. A. ALPINA, *Linn.—K.*
Reykjavik, *B.* Ovre Glamaheidi, *St.*

407. A. FLEXUOSA, *Linn.—K.*
Eydar on the Lagarfljot, *T. & G.* Reykjavik, *Mk.* Stromsneshlid, Okid, Sandlangsdal, Reykholt, Hafnarfell, *St.*

A. montana (Linn.), is a form noticed by König &c.

408. A. ATROPURPUREA, *Wahl.—G.*
A. alpina, *Fl. Dan.* t. 961.

Hornemann considered this plant a native; and Gliemann also was certain concerning it.

409. A. PRÆCOX, *Linn.*—*M.*

All since the time of Mohr record this plant.

410. TRISETUM SUBSPICATUM, *Beauv.*—*K.*

Reykjavik, Geysirs, *B.* Hafnarfjord, Granfell, *S.*! Akreyri, *C.* Scalholt, Budnested, *Mk.* Armule, Snaefellstrand, Stad under Snaefell, *St.*

411. MOLINIA CÆRULEA, *Mœnch.*—*K.*

Havn Ledelos, *M.* Eydar on the Lagarfljot, *T. & G.*

412. POA ANNUA, *Linn.*—*K.*

Reykjavik, Geysirs, *B.* Hafnarfjord, *S.* Reykholar, *St.* Reykholtdal (Borgarfjord Syssel), *Kr.*

413. POA LAXA, *Hænke.*—*V.*

Steenstrup gathered this plant, and his specimen is at Copenhagen.

414. P. FLEXUOSA, *Wahl.*—*G.*

Vahl marks this as a true native.

415. P. ALPINA, *Linn.*—*M.*

Reykjavik, Geysirs, *B.* Near the houses at Akreyri, *C.*! Granfell, *S.* Skagafjord, *Sy.*! Ovre Glamaheidi, Okid, Garfrsdal, Stromneshlid, Reykholar, *St.*

416. P. CÆSIA, *Sm.*—*S.*

Reykjavik, Geysirs, *B.* Akreyri, *C.*! Thingvellir, *Mk.* Stromneshlid, Briamslok, Grönahlid, Reykholar, Ovre Glamaheidi, *St.*

β. ASPERA.

Stadarfell, Fjallabek, *St.*

417. P. NEMORALIS, *Linn.*—*K.*

P. angustifolia, *König*, &c.

In all the lists.

β. FIRMULA.

Thingvellir, *St.*

418. P. BALFOURII, *Parn.*—*B.*

P. serotina, *Mörck in Herb.*

Reykjavik, *B.* Geysirs, *Mk.*

419. P. TRIVIALIS, *Linn.*—*K.*

Armule, Stromneshlid, Ovre Glamaheidi, Reykholar, Sandlangsdal, *St.*

Solander brought a specimen from Iceland!

420. P. PRATENSIS, *Linn.*- *K.*

Reykjavik, *B.* Laugarnes, *L.*! Olafsdal, Armule, Ovre Glamaheidi, Sandlangsdal, Thingvellir, Reykholar, *St.*

421. P. COMPRESSA, *Linn.*—*K.*

This is in all the lists without doubt, except that of Vahl.

422. **Glyceria fluitans**, *R. Br.*—*K.*
Festuca fluitans, *König* &c.
Steenstrup gathered this in Iceland.

423. **Sclerochloa maritima**, *Lindl.*—*K.*
In all the lists.

424. **Sc. distans**, *Bab.*—*G.*
Glyceria distans, β. arenaria, *Wahl.* ?
Sletta, Reykholar, *St.*

[**Briza media**, *Linn.*—*P. & Z.*
A very doubtful native.]

425. **Catabrosa aquatica**, *Beauv.*—*K.*
Garpsdal, Sandlangsdal, *St.*

426. **Dactylis glomerata**, *Linn.*
Skalholt, Reykjavik, *Mk.*

427. **Festuca ovina**, *Linn.*—*K.*
Geysirs, *B.* Hafnarfjord, *S.*! Thingvellir, *Sy.*
It is usually viviparous.

F. duriuscula (of most of the lists) and *F. heterophylla* (of P. & Z.), are probably forms of this species. Mörck gathered the former at Voxhuus.

428. **F. rubra**, *Linn.*—*K.*
Armule, Stromsneshlid, Reykholar, Garpsdal, Thingvellir, *St.*

429. **F. arenaria**, *Osb.*
Olafsdal, Okid, Thingvellir, Reykholt, *St.* Reykjavik, *B.* Eydar on the Lagarfljot, *T. & G.*

430. **F. arundinacea**, *Schr.*—*K.*
F. elatior, *König*, &c.
In all the lists. Vahl alone has any doubts concerning it.

[Preyer and Zirkel add *Bromus hordeaceus*, but give no locality or authority for it.]

431. **Triticum caninum**, *Huds.*—*K.*
Elymus caninus, *König*, &c.
In all the lists, without any doubt, except that of Vahl.

432. **T. repens**, *Linn.*—*K.*
Oefjord, *Kr.*
Steenstrup also gathered it.

[**T. cristatum**, *Schreb.*—*K.*
This is in several of the older lists. Gliemann says, "very uncertain." Hooker omits it. Hjaltalin includes it.

Retz considered that this was the plant intended by König, who is the sole real authority for it.]

433. ELYMUS ARENARIUS, *Linn.*—*K.*

On sand-hills in the deserts near Hekla, between Hekla and Modrudalr, Grimstadr, *Hd.* Hafnarfjord, Skalholt, Granfell, *S.* Skagarnes, *Mk.* Grönahlid, *St.* Myvatn, Husevig, Vapnefjord, *M.* Efferso, *Sy.*! Suthrey in Breidjfjord, *Robert.*

Henderson saw the people cutting it on the Myrdalssandr. He states that it is nowhere more plentiful than amongst the sand and ashes which cover the ground along that part of the south coast. Horrebow ('Nat. Hist. Iceland,' Engl. ed. 1758, p. 41) says that "in the district of Skaftafel grows a sort of wild corn, of which the inhabitants make bread, and, though growing wild, it is in every respect as good as the Danish. This grows in sand, and the seed that drops off sows itself. The straw they use to thatch their houses."

434. EQUISETUM ARVENSE, *Linn.*—*K.*

This is probably a common plant. It is very large at Uthlid, *B. G.* Reykjavik, Krisuvik, *St.*

β. RIPARIUM.

Reykholt, *St.*

435. E. UMBROSUM, *Willd.*—*B.*

E. pratense, *Linds.*

Thingvellir, *B.* Reykjavik, *Sy.*! Skjald-breid, *Hd.*!

436. E. SYLVATICUM, *Linn.*—*K.*

Copse near Laugarvatn, *B. G.*

It is in all the lists.

437. E. LIMOSUM, *Linn.*—*K.*

Vithimyri, Herathsvatn, *B. G.*! Reykjavik, *Kr.*

It is probable that K. and Z., from whom H., perhaps, took the name, meant by *E. fluviatile* the form of *E. limosum* which is thus named by the northern botanists. It is doubtful what Vahl meant by *E. fluviatile,* which he mentions as a doubtful native. P. & Z. seem to copy from him, but, nevertheless, give "Tjarnaellting" as its Icelandic name. Zoega calls his *E. fluviatile* "Elting;" Solander does the same, and his specimen is *E. limosum* (Fries). I refer all the Icelandic *E. fluviatile* to *E. limosum,* notwithstanding both names being included in most of the lists.

438. E. PALUSTRE, *Linn.—K.*

Reykjavik, Laxarvogr, *B.* Akreyri, *C.*! By the baths (Laugarnes) near Reykjavik, *Mk.* Briamsloek, *St.*

439. E. HYEMALE, *Linn.—K.*

Hafnarfjord, *S.* Briamsloek, *St.* It grows here and there by the sand-way between Myvatn and Husavig, also to the east of the latter place, *M.*

440. E. VARIEGATUM, *Schleich.*

In the northern and southern parts, *C.*!

There is a specimen in Hornemann's herbarium.

441. ISOETES ECHINOSPORA, *Dur.*

Laugarvatn, *St. in herb. A. Braun.*

I suppose that this is a lake by the road from Reykjavik to the Geysirs. As I believe that that lake has a peaty bottom, it is a very likely place for this plant.

Durieu has seen a specimen, and states that it is his *Isoetes echinospora* (Bull. Soc. Bot. de Fr. viii.).

442. I. LACUSTRIS, *Linn.?—G.*

Thingvellir-vatn, near the southern end of the Almannagja, sparingly, *H.* (i. 208).

It has still to be determined if the plant found in that place is the true *I. lacustris.* Judging from my recollection of the shore of the Thingvellir-vatn I should expect to find the true plant there. It will be remembered that Hooker lost his whole collection of plants, and that therefore there is no specimen by which to determine this question.

443. LYCOPODIUM CLAVATUM, *Linn.—K.*

Solander saw this in the Herb. Paulsen. B. G. says that it is common. All the lists record it.

444. L. ANNOTINUM, *Linn.—K.*

Hraun near Reykjavik, *H.*; Hafnarfjord, *S.*: these are doubtless the same place. Briamsloek, *St.*

445. L. ALPINUM, *Linn.—K.*

Common up to the perpetual snow, *Mk.* Hredavatn, *St.* Skagafjord, *Sy.*!

446. L. COMPLANATUM, *Linn.—G.*

Gliemann, Hjaltalin, and Vahl record this as a true native.

[L. DUBIUM, *Zoega.—Z.*

This plant was added to the list by Zoega, not König. It is not to be found in the 'Nova Acta,' but in Olafsen and Povelsen's work. He expresses doubts concerning its really belonging to this genus, having seen no fructification. He says, "L. surculis simplicissimis erectis compressis, foliis complicatis carinatis acutis alternis distiche imbricatis. Confertim nascitur et densis cæspitibus obtegit rupes," &c. No locality is mentioned for it. No succeeding author seems to have identified it. It was probably a state or variety of one of the known species. I am inclined to think that it may have been *L. complanatum*.]

447. L. SELAGO, *Linn.—K.*
Ascends to the perpetual snow, *Mk.* Breidabolstad, *St.* Stirtshellir, *Hd.*! Hafnarfjord, *S.*! Husavik, *T. & G.*

448. SELAGINELLA SPINULOSA, *A. Br.—K.*
Lycopodium selaginoides, *Linn.*
Reykjavik, *B.* Hafnarfjord, *S.*! Oroefa Jokul, *Hd.*! Thingvellir, *C.* Copse by Laugarvatn, *B. G.*! Seidesfjord, *Sy.*! Rangarvalla, *Mk.* Briamsloek, *St.*

449. CRYPTOGRAMME CRISPA, *R. Br.—V.*
Vahl marks this as certainly found. He is the only authority for it, except Lindsay.

450. POLYPODIUM VULGARE, *Linn.*
Hafnarfjord, *S.*! Almannagja, *B. G.* In a cave or grotto near Midalr, to the left of the road to the Geysirs, *Ld.*!

451. P. PHEGOPTERIS, *Linn.—K.*
Garde-hraun, Almannagja, *B.*

452. P. DRYOPTERIS, *Linn.—K.*
Garde-hraun, *B.* In a wood by Borgarfjord, *H.*

453. P. ALPESTRE, *Hoppe.*
Stad under Snaefell, *St.*

454. WOODSIA ILVENSIS, *R. Br.—C.*
Garde-hraun, *B.* Hafnarfjord, *S.* Selsund, *Hd.* Almannagja, *C.*!

455. W. HYPERBOREA, *R. Br.—H.*
Hooker records this as plentiful a "few miles to the south" of Reykjavik; also as growing in the Almannagja. Unfortunately his specimens were lost. Krabbe gathered it in Iceland; and there is a specimen from him at Copenhagen, but without any exact locality.

456. LASTREA THELYPTERIS, *Presl.—K.*
All the lists include this fern; and Vahl alone expresses any doubt about its really being a native. According to Fries, it

does not extend to Lapland, nor does it appear to have been found in Northern Russia.

457. L. FILIX-MAS, *Presl.—K.*
Almannagja, *Mk.*

458. POLYSTICHUM LONCHITIS, *Roth.—M.*
Capella-hraun, *Mk.* Snaefelstrand, Thorisengismule, *St.* Husavik, *T. & G.* Skagafjord, *Sy.*!

459. CYSTOPTERIS FRAGILIS, *Bernh.—K.*
Reykjavik, *B.* Hafnarfjord, *S.*! Rustskeller, Reykjaliet, Mikliboer, Selsund, Surts-hellir, *Hd.*! North coast, *C.*! At Bosavatn, half a Danish mile from Husavik, *M.* Skjalfanda, *B. G.* Skagafjord, *Sy.*! Laxaa near Reykjavik, *Mk.* Seljeland, Thingvellir, *St.* Almannagja, *Kr.*

460. C. DENTATA, *Sm.*
Garde-hraun, near Reykjavik, *B.*

Hooker records it as a native of Iceland (Sp. Fil. i. 198). He considers it a variety of *C. fragilis.* It is probably the fern noticed in his list as undescribed.

461. ATHYRIUM FILIX-FŒMINA, *Roth.—K.*
Garde-hraun, *B.* Hafnarfjord, *S.* Seythisfjord, *Sy.*! Armule, *St.*

462. ASPLENIUM FONTANUM, *Presl.—K.*
Thingvellir, *B. G.*

I presume that this is the plant which B. G. calls *Polypodium fontanum.*

463. ASPL. SEPTENTRIONALE, *Hull.—K.*
Laugardal, *B. G.*!

464. ASPL. TRICHOMANES, *Linn.—V.*
Budarhraun, *Mk.*

465. BLECHNUM BOREALE, *Sw.*
In a wood near the farm (Neofrholt ?) nearest to Hekla, *Ld.*!

Solander saw it in Paulsen's herbarium.

466. BOTRYCHIUM LUNARIA, *Sw.—K.*
Reykjavik, Geysirs, *B.* Holar, Horgadal, *B. G.* Seythisfjord, *Sy.*! Myvatn, *G.* Thingvellir, *Mk.*

467. OPHIOGLOSSUM VULGATUM, *Linn.—K.*

This is in all the lists, and Vahl alone has any doubts concerning it.

A Revision of the Genera and Species of Herbaceous Capsular Gamophyllous Liliaceæ. By J. G. Baker, Esq., F.L.S. &c.

[Read February 3, 1870.]

I believe that I am quite safe in saying that there is now no Order of flowering plants in which, at any rate in proportion to the inherent and necessary complication of the subject, there is more difficulty and loss of time incurred in determining the name of an unknown plant, than in Liliaceæ. One principal reason of this difficulty is that it is now twenty-seven years since the last general handbook of the order, the fourth volume of the 'Enumeratio' of Kunth, was written, and that, of course, during those twenty-seven years a considerable number of new genera and species have been published, the accounts of which are scattered widely through local floras and periodicals, and have never been gathered together and worked up upon a uniform plan. And, for various reasons, the work just mentioned, which is the only one that is at all available for use as a working handbook, is not well adapted for that purpose. It is the production of a very experienced and excellent botanist; but, even for that time, he does not seem to have had in this order an extensive command of material to work upon, and, in consequence, has often been obliged to compile his account of genera and species from his predecessors, who have not described them upon a uniform plan, or used a uniform terminology. His descriptions of genera are very careful and elaborate, occupying frequently the greater part of a closely printed octavo page; but, as Dr. Lindley complained when the work was published, they are scattered all through the book, and no help is given to the student, either by means of italics or an analytical key, towards choosing out from the long array of characters those which are relied upon in each particular case for furnishing the characteristic distinction of the genus. When a number of closely allied genera are dealt with in this way, I need scarcely point out that it requires a very needless expenditure of time and trouble to settle in which an unknown specimen must be placed; and not only so, but there is very great danger of an author who follows this plan making for himself, or adopting from others, genera which do not possess any definite generic individuality. To illustrate this last proposition, I need not go further than the work with which we are now dealing. As I have lately had occasion to show elsewhere, between the extreme points of *Scilla*, as that genus is (as I believe rightly) constituted in the 'Enumeratio,' four other genera which the author has adopted, must be placed, viz. *Barnardia*, *Ledebouria*, *Eratobotrys*, and *Drimia*. About half the species placed by Kunth in *Scilla* have two, and the other half have several ovules in each of the three cells of the ovary. Lindley separated, under the name of *Barnardia*, two Asiatic species, which only differ structurally from the plants just referred to by having only a single ovule in each of the cells. This character seems quite insufficient to found a genus upon, and he either overlooked or did not know that a long-known species of *Scilla* from Barbary (*parviflora* of Desfontaines) is also uniovulate. Kunth, however, keeps up *Barnardia*, but retains the Barbary plant in *Scilla*, and in consequence this latter has since been made into a monotypic genus by Steinheil under the name of *Stellaris*. The other three genera quite coincide with one another in structure, and only differ geographically, *Ledebouria* being an inhabitant of India, *Eratobotrys* of Nubia and Abyssinia, and *Drimia*, as Kunth defines it, of the Cape of Good Hope. In the typical species of *Scilla* the divisions of the perianth spread from the very base when the flower is fully expanded; but in these plants, as in the Common Wild Hyacinth of our English woods (the *Scilla nutans* of Smith and Kunth), the divisions, though not properly connate at the base, as they are in the cultivated *Hyacinthus orientalis*, yet cohere permanently in a cup, and spread only for the upper half or two-thirds. The intermediate gradation between these two shapes of flower may be easily studied in *Scilla campanulata*, which is a South-European subspecies of *nutans* very common in the gardens round London. But this is rather a digression from the main question. I believe that no one who has at all attended to the order will feel any doubt that a thorough revision both of its genera and species is needed, directed with a view to ascertain, from the consideration of all the species which are now known, what are the best limitations and diagnostic characters of the former, and to bring together the species in one view, and define them more explicitly upon a uniform plan. This is what, in the present paper, I have attempted to do for a section of the order as fully as the material at my command would permit. Liliaceæ is an order in which, as a general rule, the distinction between allied species cannot be investigated satisfactorily with dried specimens. Unfortunately for the object of this paper, these plants, after having been once the fashion, have now gone out of fashion as general objects of cultivation, and at the present time have given place to Orchids and showy bedding-plants. In consequence of this state of things I am afraid that a large proportion, especially of smaller Cape species, which have been introduced into European gardens, have been entirely, and some, I fear, irrevocably lost in a living state. On the other side of the account, we may congratulate ourselves that good figures (though often without dissections) of most of the species that have been cultivated are preserved in the 'Botanical Magazine,' the 'Botanical Register,' Sweet's 'Flower Garden,' and the magnificent plates of Jacquin; and it is to be noted also that what has just been said about dried specimens, and the differences which characterize species, fortunately does not apply, or applies much less forcibly, to those structural differences which characterize genera and subgenera. For living specimens I have used for this paper almost solely the collection at Kew and that of Mr. Wilson Saunders. Of the Liliaceæ contained in the latter, a selection of figures of some of the most interesting is contained in the number of the 'Refugium Botanicum' which is now ready to appear, which is devoted entirely to the order, and contains plates and descriptions of eighteen new species, several of which are of great horticultural interest; and, I believe, there are very few species now in cultivation in the country which these two collections do not contain. For dried specimens, I have relied mainly upon the three sets now amalgamated at Kew—those of Sir W. Hooker, Mr. Bentham, and M. Gay. The latter contains a very fine series of specimens of the European genera, especially of *Allium*, but little that is extra-European. I have consulted, when necessary, the herbaria of Linnæus and Sir J. E. Smith; but neither of them contains much affecting that part of the order which is here dealt with. There is a fine series of the older-known species (many of the specimens dried from Kew in the days of Aiton and Solander) at the British Museum, including several I have not elsewhere seen; and I wish to express my best thanks to Dr. Perceval Wright and the Trustees of the Herbarium of Trinity College, Dublin, for their courtesy in allowing me the loan, for leisurely examination and comparison with the Kew specimens, of the set of Cape Liliaceæ there gathered together under the superintendence of Dr. Harvey, which contains many unpublished species.

The section of the order dealt with in the present paper is one that is circumscribed with tolerable definiteness. I have not thought it needful to enter upon any points connected with the general characterization and relationships of the order, because I believe that these may be regarded as settled quite satisfactorily, and that any thing which I could say would only go to confirm what botanists appear to be already fully agreed upon. The great body of Endogens with a corolla-like perianth, with divisions in sixes, and stamens in sixes or threes, falls into two alliances, characterized, the one by a superior, and the other by an inferior ovary and fruit, so as to leave very few of its genera in a position at all doubtful or intermediate. In subdividing the former alliance, we get characters, which are universally regarded as of ordinal value, in the extrorse anthers, separated styles, and septicidally dehiscent capsules of Colchicaceæ. Deducting also Pontederiaceæ, a small order of not more than thirty species, in which the perianth is twisted in æstivation, there remain considerably over 1000 species, the great bulk of which agree closely in all important points of structure. It seems to be most natural to regard all these plants as constituting a single order, and to arrange the great bulk of the species in two series, in one of which the fruit is a berry, and in the other a capsule. In these two series the great bulk of the order will readily rank, and there will remain over only a few exceptional groups, each containing a few species only, such as *Roxburghia*, *Lapageria*, and *Philesia*, in which the ovary is 1-celled, with parietal placentation, Conantheræ, which approximate to Amaryllidaceæ by their partially adherent ovaries, Uvularieæ, which approximate to Colchicaceæ by their extrorse anthers, Parideæ, which approximate to Colchicaceæ by their disunited styles, and a few others. Taking the capsular series of genera, the most natural and convenient method is, I think, to dispose them in two subseries, one characterized by having the segments of the perianth free from one another down to the very base, and the other by having them joined together for at least the lower third or quarter. If we follow this method there is no difficulty in deciding clearly in which of the two subseries each genus will fall; and if we use for tribal characters the general arrangement of the inflorescence and the nature of the root-stock, the tribes of the two subseries will, to a large extent, run parallel with one another—Hyacintheæ, bulbs of the gamophyllous subseries with racemose inflorescence, answering to Scilleæ, in which the segments of the perianth are free, Hemerocallideæ in the same way to Anthericeæ, Milleæ to Allieæ, and the other tribes in each of the two subseries less closely. This is a general outline of what I believe to be the most natural classification of the order; and in this paper all the known genera and species of the gamophyllous capsular series are reviewed, with the exception of the tribe Aloineæ, which has formed the subject of a beautifully illustrated monograph by Prince Salm-Dyck.

Of the genera, I believe I have had an opportunity of examining a more or less perfect specimen of every one that has been proposed. I have kept up all for which I thought I was able to find any clearly definable structural individuality; but even as compared with the 'Enumeratio,' I have felt bound to erase a good many of the small ones from the list, finding, as I proceeded, that it was quite impossible to do otherwise and at the same time characterize genera with reasonable clearness. I must not pass this point without acknowledging my obligations to the fragment of Salisbury's 'Genera Plantarum' which Dr. J. E. Gray has lately so liberally printed and circulated. This order seems to have been a particular favourite with that author; and his researches upon it were made at a time when the cultivation of these plants was at its highest point of popularity. His planning-out and definition of the genera show great care and acuteness; but in circumscribing them he went upon a track the direct opposite of that which I have followed. It will be seen that, although I have only adopted one of his genera as a genus, I have used many of his names and groups for subordinate divisions. Indeed I may say that I have felt it only due to the sterling merits of the work, and of a botanist who left behind him no adequate memorial of his ability and industry, to incorporate as many of his groups and names as I could possibly include. The total number of genera which I have defined is 26, and of species about 220, being an average of about eight species to a genus. In this portion of the capsular series, a condition of things quite different from what we see in other parts of the order, both large genera and good monotypic genera are comparatively few in number, the rule being genera of small or moderate size, in most of the tribes clearly bounded, with

species often very near to one another. Of the 220 species, about 40 are here described for the first time; and I have placed as varieties a good many forms which may often deserve a higher rank, but which, if so, want their characters elucidated more fully from study in a living state. Half the 220 species belong exclusively to the Cape of Good Hope; one tribe, containing upwards of 30 species, belongs entirely to America; and the other 80 species are scattered over the Old World, very few of them extending beyond the bounds of the Temperate Zone.

CLAVIS TRIBUUM ET GENERUM.

Ordo **Liliaceæ.** Monocotyledones florideæ perianthio corollino regulari vel subregulari æstivatione recto, ovario supero triloculari, loculis ex angulo centrali ovuliferis, stylis connatis (raro nullis vel disjunctis vel rarissime ovario uniloculari placentis parietalibus), antheris introrsis, fructibus capsularibus vel baccatis, embryone in albumine immerso.

Subordo 1. **Liliaceæ veræ.** Fructus capsularis, trilocularis. Styli connati.

Series 1. *Perianthium segmentis basi distincte connatis.*

Tribus 1. **Hemerocallideæ.** Herbæ radicibus crasse fibrosis, floribus racemosis vel paniculatis pedunculis paullulum foliatis.

* *Inflorescentia paniculata.*

1. **Phormium.** Perianthium tubulosum. Folia rigida. Flores copiose thyrsoideo-paniculati. *Nova-Zelandia et Insula Norfolk.*
2. **Hemerocallis.** Perianthium late infundibuliforme. Folia graminoidea. Flores sparse corymboso-paniculati. *Regiones boreali-temperatæ veteris orbis.*

** *Inflorescentia racemosa.*

3. **Kniphofia.** Perianthium tubulosum, limbo perbrevi. Folia angusta, dura. *Cap. B. Spei et Africa trop. orientalis.*
4. **Blandfordia.** Perianthium infundibuliforme segmentis tubo 5–6-plo brevioribus, staminibus supra medium insertis. Capsula longe stipitata, septicide trivalvis. Folia angusta dura. *Australia.*
5. **Funkia.** Perianthium infundibuliforme, segmentis tubo æquantibus. Stamina hypogyna. Capsula sessilis, loculicide trivalvis. Folia lata. *Japonia, China borealis, Siberia orientalis.*

Tribus 2. AGAPANTHEÆ. Herbæ radicibus crasse fibrosis, floribus umbellatis pedunculis nudis. *Capenses.*

6. AGAPANTHUS. Perianthium infundibuliforme. Filamenta foliiformia, declinata. Capsula septicide trivalvis.

7. TULBAGHIA. Perianthium rotatum. Filamenta nulla. Capsula loculicide trivalvis.

Tribus 3. MILLEÆ. Herbæ bulbosæ pedunculis nudis, floribus umbellatis vel raro solitariis. *Americanæ.*

* *Coronatæ.*

8. ANDROSTEPHIUM. Tubus infundibuliformis, segmentis æquans. Filamenta prorsus in coronam concreta. Capsula loculicide trivalvis. *Texas.*

9. BESSERA. Tubus campanulatus, segmentis 4–6-plo brevior. Filamenta dimidio superiore libera. Capsula septicide trivalvis. *Mexico.*

** *Ecoronatæ.*

10. LEUCOCORYNE. Perianthium infundibuliforme vel subrotatum segmentis tubo æquantibus vel brevioribus. Antheræ 3, in tubo subsessiles. Staminodia 3, calcariformia, ad faucem inserta. *Chili, Peruvia.*

11. BRODIÆA. Perianthium infundibuliforme (vel in specie unica late tubulosum) segmentis tubo longioribus vel brevioribus. Antheræ 3, ad faucem sessiles. Staminodia 3, petaloidea, cum antheris uniseriata. *Amer. borealis occidentalis.*

12. MILLA. Perianthium infundibuliforme, tubo cylindrico vel campanulato, segmentis tubo æquantibus vel 2–4-plo brevioribus. Stamina 6, perigyna, uniseriata vel biseriata. *Amer. borealis et australis præcipue occidentalis.*

Tribus 4. MASSONIEÆ. Herbæ bulbosæ pedunculis nudis brevibus vel subnullis, floribus congestis corymbosis raro solitariis. *Capenses.*

13. MASSONIA. Perianthium tubuloso-gamophyllum segmentis æqualibus linearibus vel lanceolatis. Folia 2.

14. BRACHYSCYPHA. Perianthium campanulato-gamophyllum, segmentis ligulatis interioribus paulo longioribus. Folia plurima.

15. DAUBENYA. Perianthium tubuloso-gamophyllum limbo subbilabiato segmentis valde inæqualibus. Folia 2.

Tribus 5. HYACINTHEÆ. Herbæ bulbosæ pedunculis nudis, floribus racemosis raro spicatis vel solitariis.

* *Segmenta limbi distincte difformia.*

16. DIPCADI. Perianthium viride vel flavo-virescens, tubuloso-gamophyllum. Filamenta brevia recta. Semina discoidea. *Regiones præcipue temperatæ veteris orbis.*

17. LACHENALIA. Perianthium albidum vel fulgens, campanulato-gamophyllum. Filamenta elongata, declinata. Semina parva, lagenæformia. *Capenses.*

** *Segmenta limbi conformia deltoidea.*

18. VELTHEIMIA. Perianthium rubrum, longe tubulosum, filamentis filiformibus ad medium tubi uniseriatim insertis. *Capenses.*

19. MUSCARI. Perianthium cæruleum, oblongo- vel obovoideo-urceolatum, filamentis brevibus prope medium tubi biseriatim insertis. *Eur. merid. Barbaria, Oriens.*

20. LITANTHUS. Perianthium viridescens, perparvum, solitarium, tubulosum, staminibus ad faucem sessilibus uniseriatis. *Capenses.*

*** *Segmenta limbi conformia, ligulato-lanceolata.*

21. DRIMIA. Perianthium campanulato-gamophyllum, segmentis ligulatis cucullatis. Semina discoidea. Filamenta elongata, leviter declinata. *Cap. B. Spei, Afr. trop.*

22. HYACINTHUS. Perianthium infundibuliforme, segmentis planis ascendentibus vel falcatis. Filamenta recta. Antheræ versatiles. Semina parva, ediscoidea. *Eur. merid., Oriens, Africa bor. et merid.*

23. RHADAMANTHUS. Perianthium campanulatum, segmentis erectis. Filamenta recta. Antheræ adnatæ. Semina discoidea. *Capenses.*

24. PUSCHKINIA. Perianthium rotatum, turbinato-gamophyllum, fauce tubo profunde 6-dentato coronatum. Antheræ versatiles, filamentis brevibus intra coronam insertis. Semina parva, ediscoidea. *Oriens.*

25. CHIONODOXA. Perianthium rotatum, turbinato-gamophyllum. Corona nulla. Antheræ versatiles, filamentis brevibus petaloideis. Semina parva, ediscoidea. *Oriens.*

Tribus 6. ODONTOSTEMONEÆ. Herba bulbosa floribus racemoso-paniculatis pedunculo sparse foliato.

26. ODONTOSTEMUM. Genus solum. *California.*

1. PHORMIUM, *Forst.*

Forst. Gen. No. 24; *Endl. Gen.* No. 1101; *Kunth, Enum.* iv. 274; *Hook. fil. Flo. Nov. Zel.* 286; *Salisb. Gen.* 81.—Chlamydia, *Banks & Sol. in Gærtn. Fruct.* t. 18, p. 71.

Perianthium tubuloso-infundibuliforme, marcescens, leviter curvatum, basi obconica solum gamophyllum, segmentis exterioribus firmioribus, lanceolatis, acutis, interioribus longioribus apice subpatulis. *Stamina* 6, ad basin segmentorum inserta, *filamentis* filiformibus æqualibus exsertis leviter curvatis, *antheris* lineari-oblongis versatilibus. *Ovarium* sessile, oblongotriquetrum, ovulis copiose biseriatis; *stylus* filiformis, staminibus æquans, subdeclinatus; *stigma* capitatum. *Capsula* cornea, cylindraceo-triquetra, loculicide trivalvis, seminibus oblongis complanatis alatis, testa nitida, nigra. *Herbæ elatæ radicibus crasse fibrosis, foliis rigidis equitantibus distichis, floribus copiose thyrsoideo-paniculatis, pedicellis apice articulatis. De impprægnatione ovuli cfr.* Schacht, Ann. Sc. Nat. ser. 4, viii. 275, t. 4.

Folia 2–3 poll. lata, apice fissa .... 1. *tenax.*
Folia 9–18 lin. lata, apice vix fissa ...... 2. *Cookianum.*

1. P. TENAX, *Linn. Suppl.* 204; *Cook, It.* ii. 96, *cum icone*; *Red. Lil.* t. 448–449; *Bot. Mag.* t. 3199; *Kunth, Enum.* iv. 274; *Hook. fil. Nov. Zel.* 286. Folia utrinque scapum 4–6, 4 pedes vel ultra longa, 2–3 poll. lata, supra subglauca, extrorsum intense glauca, margine et carina cite rubro-brunnea, apice fissa. Scapus cum panicula 5–7-pedalis. Perianthium 18–21 lin. longum, flavo-coccineum. Capsula 3–6 poll. longa, 5–6 lin. crassa. *Nova Zelandia, Insula Norfolk.* Embryo sæpe ante lapsum seminis germinans.

2. P. COOKIANUM, *Lejolis, Bull. Soc. Hort. Cherb.* p. 71; *Walp. Ann.* iii. 630—P. Colensoi, *Hook. fil. in Raoul, Choix,* p. 41; *Flo. Nov. Zel.* p. 287.—P. Forsterianum, *Hook. Journ. Bot.* 1844, p. 8, 1851, p. 220. Minor; scapus cum panicula 3–6-pedalis; folia 2–3 pedes longa, 9–18 lin. lata, magis acuminata, apice vix fissa. Perianthium 12–15 lin. longum, magis flavum vel segmentis exterioribus virescentibus. Capsula gracilior, sæpe longior. *Nova Zelandia.*

2. HEMEROCALLIS, *Linn.*

Linn. Gen. No. 433 (*ex parte*); *Endl. Gen.* No, 1143; *Kunth, Enum.* iv. 587; *Salisb. Gen.* p. 81.

Perianthium late infundibuliforme, segmentis oblongo-spathulatis æquilongis flore expanso recurvatis, interioribus paullulum latioribus, tubo multo longioribus. *Stamina* 6, ad faucem tubi inserta, *filamentis* filiformibus segmentis brevioribus declinatis, *antheris* lineari-oblongis versatilibus. *Ovarium* subsessile, oblongum, obtuse trigonum, ovulis copiose biseriatis; *stylus* filiformis, declinatus, staminibus longior; *stigma* capitatum. *Capsula* carnoso-coriacea, obtuse trigona, rugosa, basi angustata, loculicide trivalvis, seminibus in loculo 6–12, biseriatis, subcompressis exalatis; *testa* nitida, nigra. *Herbæ radicibus carnoso-fibrosis, foliis linearibus textura graminoideis, floribus speciosis, magnis, sparse corymboso-paniculatis.*

Flores odori, vitellini.
  Segmenta interiora firma venis haud conjunctis. 1. *flava.*
  Segmenta interiora margine membranacea, venis paucis conjunctis.
    Folia 2–3 lin. lata; pedicelli et tubi elongati. 2. *minor.*
    Folia 6–8 lin. lata; perianthium tubo brevissimo, segmentis interioribus 5–6 lin. latis .... 3. *Dumortieri.*
    Folia 8–12 lin. lata; pedicelli subnulli; perianthium tubo 5–6 lin. longo, segmentis interioribus 9–12 lin. latis. 4. *Middendorfii.*
Flores inodori, fulvi, segmentis interioribus margine membranaceo-undulatis venis multis conjunctis .... 5. *fulva.*

1. H. FLAVA, *Linn. Sp.* 462; *Jacq. Hort. Vind.* t. 139; *Bot. Mag.* t. 19; *Red. Lil.* t. 15; *Kunth, Enum.* iv. 588; *Reich. Ic.* t. 1112. Folia 18–24 poll. longa, 6–8 lin. lata, viridia. Scapus foliis excedens. Corymbus sæpe 6–9-florus, pedicellis 12–24 lin. longis, bracteis parvis lanceolatis. Flores odori, vitellini, 3–4 poll. longi, tubo cylindrico 6–15 lin. longo, segmentis omnibus firmis venulis haud anastomosantibus, exterioribus 6–8 lin. latis, interioribus paullulum latioribus apice minus angustatis. *E Gallia per Europam meridionalem ad Siberiam occidentalem*; *Japonia* (*an indigena ?*).

2. H. MINOR, *Mill. Dict.* No. 2.—H. graminea, *Andr. Bot. Rep.* t. 244; *Kunth, Enum.* v. 588; *Miquel, Ann. Mus. Lug. Bat.* iii. 152.—H. graminifolia, *Schlecht. Abh. zu Halle, neue Folge,* Bd. i. *quart.* iv. p. 15. H. pumila, *Salisb. Gen.* p. 81. Folia 15–18 poll. longa, vix ultra 3 lin. lata, saturate viridia. Scapus foliis subæquans. Corymbus 3–6-florus, pedicellis 3–24 lin. longis, bracteis parvis lanceolatis. Flores odori, vitellini, 2½–4 poll. longi, tubo cylindrico 6–12 lin. longo, segmentis exterioribus firmis 4–5 lin. latis, interioribus latioribus ob-

tusioribus, margine membranaceis, venulis paucis conjunctis. *Siberia orientalis, China borealis, et Japonia.*

3. H. Dumortieri, *Morren, Hort. Belg.* ii. p. 195, t. 43; *Miquel, Ann.* iii. 152; *Baker in Saund. Ref. Bot.* t. 213.—H. graminea β. humilior, *Maxim. Prim.* 285.—H. Sieboldii et rutilans, *Hort.*—H. graminea, *Schlecht. loc. cit.* Folia 12–15 poll. longa, 6–8 lin. lata, viridia. Scapus foliis vix æquans. Corymbus 2–3-florus, pedicellis 3–6 lin. longis, bracteis late lanceolatis pedicellis subæquantibus. Flores odori, vitellini, 2-2½ poll. longi, tubo perbrevi (2–3 lin. longo) vel subnullo, segmentis exterioribus firmis 4–5 lin. latis, interioribus 6 lin. latis obtusioribus margine membranaceis venulis paucis conjunctis. *Siberia orientalis et Japonia.*

4. H. Middendorfii, *Traut. et Mey. Fl. Ochot.* 94; *Maxim. Amur.* 283; *Regel, Gart.* t. 522. Folia 15–18 poll. longa, 8–12 lin. lata, viridia. Scapus foliis subæquans. Corymbus 2–4-florus, pedicellis brevissimis, bracteis magnis deltoideis interdum 1 poll. longis sufful- Flores odori, vitellini, 3–4 poll. longi, tubo cylindrico 5–6 lin. ongo, segmentis exterioribus subacutis 6–9 lin. latis, interioribus 9–12 lin. latis obtusis, margine membranaceis venulis paucis conjunctis. *Amurland,* Maximowicz!

5. H. fulva, *Linn. Sp.* 462; *Bot. Mag.* t. 64; *Red. Lil.* t. 16; *Kunth, Enum.* iv. 588; *Reich. Ic.* t. 1113.—H. disticha, *Don in Sweet, Fl. Gard.* t. 28; *Kunth, loc. cit.*—H. crocea, *Lam. Gall.* iii. 267. Fo- a 1½-2 pedes vel ultra longa, 9–15 lin. lata, infra primum glauca. Scapus 2–3-pedalis. Corymbus 6–12-florus, pedicellis brevibus, bracteis parvis lanceolatis. Flores inodori, extus flavi, intus fulvo-rubri, 3–4 poll. longi, tubo 9–12 lin. longo, segmentis exterioribus firmis planis 6–9 lin. latis subacutis, interioribus sæpe 1 poll. latis margine membranaceo-undulatis venis multis conjunctis. *E Gallia per Europam meridionalem ad Japoniam. Lahul,* Jaeschke! *Khasia,* Griffith! —H. Kwanso, *Hort.* (Regel, Gart. t. 500) est forma magna hortensis flore pleno.

Var. β. angustifolia, *Baker.*—H. longituba, *Miquel, Ann. Mus. Lug. Bat.* iii. 152. Multo minor; scapus subpedalis; folia 12–18 poll. longa, 2–4 lin. lata; segmenta perianthii angustiora, acutiora. *Japonia, teste* Miquel, *Khasia, regio temperata,* Hook. fil.! *Guriel et Karabagh,* Fischer!

2*. Hesperocallis, *A. Gray.*

A. Gray, Proc. Amer. Acad. 1867, p. 390.

Perianthium infundibuliforme, segmentis erectis subæqualibus oblongo-spathulatis medio 5–7-nervatis flore expanso leviter imbricatis, tubo cylindrico duplo longioribus. *Stamina* 6, ad faucem tubi inserta, *filamentis* filiformibus æqualibus subrectis segmentis brevioribus antheris lineari-oblongis versatilibus. *Ovarium* subsessile, globosum, ovulis copiose biseriatis; *stylus* filiformis, staminibus longior, extrorsum leviter curvatus; *stigma* capitatum. *Capsula* substipitata, subglobosa, loculicide trivalvis, seminibus in loculo 16–20 compressis exalatis; *testa* nigra, nitida. *Herba caule foliato e "bulbo eduli" (an cormo?) oriente, foliis linearibus textura graminoideis, floribus speciosis laxe racemosis pedicellis apice articulatis. Vix ab* Hemerocallide *generice separanda*?

1. H. UNDULATA, *A. Gray, loc. cit.* Caulis bipedalis; folia linearia, margine membranacea, valde undulata; pedicelli 2–3 lin. longi; bracteæ coriaceæ, lanceolatæ, pedicellis 2–3-plo longiores; perianthium 24–27 lin. longum, pallide flavum, segmentis circiter 4 lin. latis centro solum verticaliter nervatis. *California* (*Fort Mohave*), Dr. Cooper! *Mexico Nova,* Prof. Newberry.

3. KNIPHOFIA, *Mœnch.*

Mœnch, Meth. 631; *Endl. Gen.* 1114; *Kunth, Enum.* iv. 550; *Harv. Gen.* 2nd edit. 399.—Tritoma, *Ker, Bot. Mag.* t. 744.—Tritomanthe, *Link, Enum.* i. 333.—Triclissa, *Salisb. Gen.* 75.—Rudolphorœmeria, *Steud. in Schimp. Pl. Abyss.* No. 752.

Perianthium longe tubuloso-gamophyllum, leviter curvatum, segmentis perparvis deltoideis subæqualibus. *Stamina* 6, hypogyna, *filamentis* filiformibus inclusis vel exsertis, 3 paulo longioribus, *antheris* parvis oblongis versatilibus. *Ovarium* sessile, oblongum, ovulis copiose biseriatis; *stylus* filiformis, filamentis excedens; *stigma* trisulcatum. *Capsula* firma, oblonga, sessilis, loculicide trivalvis, seminibus copiose biseriatis subcompressis, arillo parvo pallido præditis. *Testa* atro-castanea, punctata. *Herbæ radicibus carnoso-fibrosis, foliis multis firmis angustis subtriquetris persistentibus, floribus flavo-coccineis dense racemosis.*

Perianthium 3–4 lin. longum, subæqualiter tubulosum, staminibus omnibus demum exsertis.

Bracteæ floribus triplo breviores .... 1. *parviflora.*
Bracteæ floribus sesqui vel duplo breviores .. 2. *breviflora.*

Perianthium 6–7 lin. longum, tubo pergracili vix ultra ⅓ lin. crasso . . . . 3. *gracilis.*
Perianthium 8–10 lin. longum, supra ovarium vix constrictum, exsiccatum 1–1½ lin. crassum.
Stamina inclusa; folia 1 lin. lata . . . . 4. *triangularis.*
Stamina longiora demum exserta.
Folia 2–3 lin. lata, venis 2–3-jugis . . . . . . 5. *abyssinica.*
Folia 4–6 lin. lata, venis 6–8-jugis . . . . . . 6. *sarmentosa.*
Perianthium 15–18 lin. longum, exsiccatum 3–4 lin. crassum, supra ovarium valde constrictum . . . . 7. *isoetifolia.*
Perianthium 6–8 lin. longum, exsiccatum 2½–3 lin. latum, supra ovarium valde constrictum.
Bracteæ ovato-lanceolatæ, 1½–2 lin. longæ . . 8. *Quartiniana.*
Bracteæ lineares, 4–6 lin. longæ.
Stamina vix exserta . . . . 9. *Grantii.*
Stamina omnia demum exserta . . . . 10. *pumila.*
Perianthium 15–18 lin. longum, supra ovarium leviter constrictum, exsiccatum 2–2½ lin. latum.
Folia viridia; stamina longiora vix exserta.
Bracteæ oblongo-lanceolatæ, pedicellis vix longiores. 11. *Burchellii.*
Bracteæ lanceolatæ, pedicellis 2–3-plo longiores.
Folia 1 poll. lata, venis utrinque costæ 12–15. 12. *præcox.*
Folia 15–18 lin. lata, venis utrinque costæ circiter 20. 13. *Rooperi.*
Folia glauca; stamina longiora demum exserta. 14. *aloides.*

1. K. PARVIFLORA, *Kunth, Enum.* iv. 553. Folia 2 lin. lata, margine lævia. Racemus 3 poll. longus, pedicellis brevissimis, bracteis ovatis vix ultra 1 lin. longis. Perianthium vix 4 lin. longum, tubulosum, staminibus exsertis. Loculi 4–5-ovulati. *Cap. B. Spei,* Drège, 4528 (*non vidi*).

2. K. BREVIFLORA, *Harv. MSS.* Folia 9–12 poll. longa, deorsum 1 lin. lata, lævia, venis utrinque costæ 2. Scapus foliis subæquans. Racemus 12–18 lin. longus, expansus 1 poll. latus. Bracteæ ovato-lanceolatæ, 2–2½ lin. longæ. Pedicelli infimi vix ½ lin. longi Perianthium flavum, in floribus superioribus 2 lin., in inferioribus 3–3½ lin. longum, exsiccatum 1 lin. latum, supra ovarium vix constrictum, staminibus omnibus demum exsertis. Loculi 4–5-ovulati. *Cap. B. Spei* (*Draachensberg, Orange Free State*), Cooper, 1029!

3. K. GRACILIS, *Harv. MSS.* Folia bipedalia, deorsum 2 lin. lata, margine lævia, venis utrinque costæ 5–6. Scapus foliis subæquans. Racemus 2½–3 poll. longus, expansus 12–15 lin. latus. Bracteæ ovatæ, naviculares, obtusæ, 1½–2 lin. longæ. Pedicelli vix ultra ½ lin. longi. Perianthium albidum, 6–7 lin. longum, tubo pergracili (haud ultra ⅓ lin. crasso) ore dilatato, laciniis ligulato-spathulatis 1 lin. longis, staminibus longioribus et stylo demum exsertis. *Natal* (*Zulu*), Gerrard et M'Ken, 2140!

4. K. TRIANGULARIS, *Kunth, Enum.* iv. 551. Folia subpedalia, lævia, vix ultra 1 lin. lata, vena solitaria utrinque costæ, supra omnino triquetra. Scapus foliis subæquans. Racemus 1½–2 poll. longus, expansus 15–16 lin. latus. Bracteæ lineari-lanceolatæ, 3–4 lin. longæ, pedicellis multoties longiores. Perianthium 8–9 lin. longum, exsiccatum 1 lin. latum, staminibus inclusis. Loculi 8–9-ovulati. *Cap. B. Spei*, Drège, 3524!

5. K. ABYSSINICA, *Schwein. Beit.* 249.—Veltheimia abyssinica, *Red. Lil.* t. 186. Folia 9–12 poll. longa, 2–3 lin. lata, lævia, venis utrinque costæ 2–3. Scapus foliis subæquans. Racemus 1 poll. vel in planta culta 2 poll. longus. Bracteæ lanceolatæ, 2–3 lin. longæ, pedicellis 2–3-plo longiores. Perianthium 9–10 lin. longum, exsiccatum 1 lin. latum, staminibus demum exsertis. *Abyssinia*, Dr. Roth!

6. K. SARMENTOSA, *Kunth, Enum.* iv. 552.—Aletris, *Andr. Bot. Rep.* t. 54.—Veltheimia, *Willd. Enum.* 380.—Tritoma media, *Gawl. Bot. Mag.* t. 744; *Red. Lil.* t. 161. Folia glauca, lævia, 12–18 poll. longa, 4–6 lin. lata, venis utrinque costæ 6–8. Scapus foliis subæquans vel excedens. Racemus 2–4 poll. longus, densiflorus, expansus 2 poll. latus. Bracteæ lanceolatæ, 3–5 lin. longæ. Pedicelli 1½-2 lin. longi. Perianthium 9–10 lin. longum, supra ovarium vix constrictum, exsiccatum 1½–2 lin latum, stylo et staminibus longioribus demum exsertis. Loculi 10–12-ovulati. *Cap. B. Spei*; *Natal*, Sanderson, 416!

7. K. ISOETIFOLIA, *A. Rich. Fl. Abyss.* ii. 324; *Schwein. Beit.* 294. —Rudolphorœmeria isoetifolia, *Steud. in Schimp. Pl. Abyss.* no. 721. Folia 6–8, magis herbacea quam in speciebus reliquis, 6–9 poll. longa, deorsum 2 lin. lata, dorso et margine scabra, venis utrinque costæ 3–4. Scapus foliis distincte excedens, 12–15 poll. longus. Racemus 1½–2 poll. longus, expansus 2½–3 poll. latus. Bracteæ lanceolatæ, inferiores 5–6 lin. longæ, pedicellis multoties longiores. Perianthium 15–18 lin. longum, supra ovarium valde constrictum, exsiccatum 3–4 lin. latum, stylo et interdum staminibus longioribus demum exsertis. Loculi 6–8-ovulati. *Abyssinia*, Schimper, 511! 752!

8. K. QUARTINIANA, *A. Rich. Fl. Abyss.* ii. 324. Folia 12–18 poll. longa, deorsum 8–9 lin. lata, margine scabra, venis utrinque costæ

12–15. Scapus foliis excedens. Racemus 5-6 poll. longus, densiflorus, expansus 15–18 lin. latus. Bracteæ ovato-lanceolatæ, 1½–2 lin. longæ, ad apicem acutum cite angustatæ. Pedicelli 1½ lin. longi. Perianthium 7–8 lin. longum, ore exsiccatum 2½ lin. latum. Styli et stamina omnia demum exserta, longiora 1 poll. attingentia. *Abyssinia,* Quartin-Dillon et Petit!

9. K. GRANTII, *Baker.* Folia 7–8, 12–15 poll. longa, 5–6 lin. lata, ad apicem sensim angustata, margine lævia, venis utrinque costæ 10–15. Scapus foliis subæquans. Racemus densiflorus, 2–2½ poll. longus. Bracteæ lineares, inferiores 4–6 lin. longæ. Pedicelli vix 1 lin. longi. Perianthium 9–10 lin. longum, supra ovarium valde constrictum, ore exsiccatum 2½–3 lin. latum, stylo exserto, staminibus inclusis. *Africa tropicalis, lat.* 6° S., *long.* 33° E., *alt.* 4400 *pedes anglicanæ,* Speke et Grant!

10. K. PUMILA. *Kunth, Enum.* iv. 552 (*excl. syn. Red.*).—Aletris. *Ait. Kew.* i. 464.—Tritoma, *Bot. Mag.* t. 764.—Veltheimia, *Willd. Sp. Plant.* ii. 182. Folia 12–18 poll. longa, 6–8 lin. lata, venis utrinque costæ 10–12, glauca, margine scabra. Scapus foliis excedens. Racemus 3–5 poll. longus, densiflorus, expansus 16–18 lin. latus. Bracteæ lineares, acuminatæ, 4–6 lin. longæ. Pedicelli vix 1 lin. longi. Perianthium 6–8 lin. longum, supra ovarium valde constrictum, ore exsiccatum 2½–3 lin. latum. Styli et stamina omnia demum exserta, longiora perianthio sesqui excedentia. *Cap. B. Spei.*

11. K. BURCHELLII, *Kunth, Enum.* iv. 552.—Tritoma, *Herbert, Lindl. Bot. Reg.* t. 1745.—K. laxiflora, *Kunth, loc. cit.* Folia 2–3 pedes longa, 6–9 lin. lata, viridia, margine et carina nunquam scabra, venis utrinque costæ 15–20. Scapus foliis subæquans. Racemus 3–4 poll. longus densiflorus, expansus 2½–3 poll. latus. Bracteæ oblongo-lanceolatæ, acutæ vel obtusæ, 2–3 lin. longæ. Pedicelli 2–2½ lin. longi. Perianthium 15–18 lin. longum, supra ovarium leviter constrictum, exsiccatum 1½–2 lin. latum. Stylus demum exsertus. Stamina longiora vix exserta. Loculi 10–12-ovulati. *Cap. B. Spei,* Thunberg! Burchell! *&c.* Floret in Septembri in hortis nostris.

12. K. PRÆCOX, *Baker in Saund. Ref. Bot.* t. 168. Folia 2–2½ pedes longa, deorsum 1 poll. lata, margine scabra, carina lævia, pallide viridia, haud glauca, venis utrinque costæ 12–15. Scapus 15–18 poll. longus. Racemus 3–4 poll. longus, densissimus, 3 poll. latus. Bracteæ lanceolatæ, acutæ, 4–6 lin. longæ. Pedicelli 1½–2 lin. longi. Perianthium 16–18 lin. longum, supra ovarium leviter constrictum, exsiccatum 2–2½ lin. latum. Stamina longiora fauce attingentia. Stylus leviter exsertus. *Cap. B. Spei,* Cooper (*v. v. in Hort. Saunders*). Floret in Maio in hortis nostris.

13. K. ROOPERI, *Lemaire, Jard. Fleur.* t. 362.—Tritoma Rooperi,

Moore, Gard. Comp. i. 113, *cum icone.* Folia 2 pedes longa, deorsum 15–18 lin. lata, pallide viridia, margine scabra, venis utrinque costæ circiter 20, sursum sensim angustata. Scapus subpedalis. Racemus densus, 3–4 poll. longus, expansus 3 poll. latus. Bracteæ lanceolatæ, 3–4 lin. longæ, pedicellis multoties excedentes. Perianthium 16–18 lin. longum, supra ovarium leviter constrictum, exsiccatum 2–2½ lin. latum, staminibus haud exsertis. *Kaffraria*, Capt. Rooper (*v. v. cult.*).

14. K. ALOIDES, *Mœnch, Meth.* 631; *Kunth, Enum.* iv. 551; *Flore des Serres*, t. 1393.—K. Uvaria, *Hook. Bot. Mag.* t. 4816.—Aloe Uvaria, *Linn. Sp. Plant*, 460.—Aletris Uvaria, *Linn. Mant.* 308.—Tritoma Uvaria, *Gawl. Bot. Mag.* t. 758; *Red. Lil.* t. 291. Folia 2–3 pedes longa, 8–12 lin. lata, glauca, margine et carina scabra vel sæpe omnino lævia, venis utrinque costæ 12–15. Scapus foliis paullulum excedens. Racemus densissimus, in hortis sæpe 5–6 poll. longus, 2½–3 poll. latus. Bracteæ lanceolatæ, 3–4 lin. longæ, pedicellis 2–3-plo longiores. Perianthium 16–18 lin. longum, supra ovarium leviter constrictum, exsiccatum 2–2½ lin. latum. Styli et stamina longiora demum exserta. Loculi 12–15-ovulati. *Cap. B. Spei*, Drège! Zeyher 113! *&c.* Floret in Septembri in hortis nostris.

Var. *β.* MINOR, *Baker*.—Minor, foliis vix ultra 3 lin. latis, margine lævibus vel scabris, pedicellis brevioribus, perianthio graciliore pallide aurantiaco, 10–12 lin. longo, staminibus inclusis. *Zulu*, Gerrard et M'Ken 2141! (*bracteæ ovatæ subobtusæ*), Mrs. Barber, 524! (*bracteæ lanceolatæ*). Ab typo ad *K. sarmentosam* vergens.

4. BLANDFORDIA, *Smith.*

Smith, Exot. Bot. 54, t. 4; *R. Br. Prodr.* 295; *Endl. Gen.* No. 1104; *Kunth, Enum.* iv. 589; *Hook. fil. Fl. Tasm.* ii. 49; *Salisb. Gen.* 80.

Perianthium rectum, infundibuliforme, marcescens, segmentis æqualibus oblongo-deltoideis tubo 5–6-plo brevioribus. *Stamina* 6, ad vel supra medium tubi inserta; *filamentis* filiformibus æqualibus haud exsertis, antheris lineari-oblongis versatilibus. *Ovarium* longe stipitatum, cylindrico-trigonum, *ovulis* copiose biseriatis, in stylum brevem rectum sensim attenuatum; *stigma* trisulcatum. *Capsula* firma, longe stipitata, exserta, clavato-triquetra, septicide-trivalvis, seminibus parvis lineari-oblongis compressis copiose biseriatis; *testa* grisea, dense pubescens. *Herbæ radicibus crasse fibrosis, foliis numerosis duris persistentibus anguste linearibus venis exsculptis, floribus numerosis speciosis breviter racemosis, pedicellis apice haud articulatis, floriferis nutantibus, fructiferis erectis.*

Filamenta supra medium tubi inserta, 3 lin. longa. Bracteæ lineari-acuminatæ .... 1. *grandiflora.*
Filamenta ad medium tubi inserta, 6–10 lin. longa. Bracteæ lanceolatæ, pedicellis distincte breviores.
  Folia margine nullo modo serrulata ...... 2. *Cunninghami.*
  Folia margine serrulato-scabra.
    Perianthium anguste infundibuliforme, 3–4-plo longius quam latum.......................... 3. *nobilis.*
    Perianthium late infundibuliforme, vix 2-plo longius quam latum.
      Pedicelli infimi floribus æquantes .... 4. *aurea.*
      Pedicelli infimi floribus multo breviores 5. *flammea.*

1. B. GRANDIFLORA*, *R. Br. Prodr.* 296; *Bot. Reg.* 924; *Kunth, Enum.* iv. 590; *Paxt. Fl. Gard.* vii. 219; *Hook. fil. Fl. Tasm.* ii. 249.—B. grandiflora, marginata *et* Backhousii, *Lindl. Bot. Reg.* 31, sub t. 18.—Aletris punicea, *Lab. Nov. Holl.* i. 85, t. 111. Folia 12–18 poll. longa, 3–4½ lin. lata, margine serrulato-scabra, venis utrinque costæ 6–8. Flores 10–30, pedicellis infimis floriferis 18–24 lin. longis. Bracteæ inferiores lineares, longe acuminatæ, 12–18 lin. longæ. Perianthium flavo-coccineum, 16–21 lin. longum, ore exsiccatum 5–6 lin. latum, segmentis tubo sensim ampliato 5–6-plo brevioribus. Filamenta supra medium tubi inserta, 3 lin. longa. *Tasmania,* Gunn, 241! Archer, &c.

Var. *β.* INTERMEDIA, *Baker.*—B. intermedia, *Herbert, Bot. Reg.* 31, *Suppl.* 64. Folia angustiora (2 lin. lata); bracteæ breviores; flores minores (12–18 lin. longæ); filamenta ad medium tubi inserta. *Tasmania,* Gunn! Verisimiliter species vera, inter *grandifloram* et *nobilem* medium tenens.

2. B. CUNNINGHAMI, *Lindl. Bot. Reg.* 31, sub t. 18; *Hook. Bot. Mag.* t. 5734. Folia 18–24 lin. longa, 3–4 lin. lata, margine haud serrulata, venis utrinque costæ 5–6. Flores 10–15, pedicellis infimis floriferis 9–12 lin. longis. Bracteæ lanceolatæ, infimæ 6–9 lin. longæ. Perianthium flavo-coccineum, 21–24 lin. longum, ore exsiccatum 1 poll. latum, segmentis tubo spathulatim ampliato 5–6-plo brevioribus. Filamenta ad medium tubi inserta, 9–10 lin. longa. *Cambria Nova Australis* (*Blue Mountains*), A. Cunningham!

3. B. NOBILIS, *Smith, Exot. Bot.* 5, t. 4; *R. Br. Prod.* 296; *Bot. Mag.* t. 2003; *Bot. Reg.* t. 286; *Reich. Exot.* t. 91; *Kunth, Enum.* iv. 590; *Lindl. Bot. Reg.* 31, sub t. 18. Folia 12–18 poll. longa, saturate viridia, durissima, triquetra, ½–¾ lin. lata, margine leviter

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* Nomen nunc decipiens; flores sunt minores quam in 2, 4, 5.

serrulato-scabra, venis utrinque costæ 2–3. Flores 4–9, pedicellis infimis floriferis 9–15 lin. longis. Bracteæ lanceolatæ, inferiores 3–6 lin. longæ. Perianthium flavo-coccineum, 12–18 lin. longum, ore exsiccatum 4–5 lin. latum, segmentis tubo spathulatim ampliato 5–6-plo brevioribus. Filamenta ad medium tubi inserta, 6–8 lin. longa. *Cambria Nova Australis,* Sieber, 195 ! Backhouse ! &c.

4. B. AUREA, *Hook. fil. Bot. Mag.* t. 5809. Folia 8–12 poll. longa, 1½–2 lin. lata, margine serrulato-scabra, venis utrinque costæ 3–4. Flores 3–6, pedicellis infimis 18–24 lin. longis. Bracteæ lanceolatæ, pedicellis multo breviores. Perianthium aureum, 18 lin. longum, ore exsiccatum 15 lin. latum, segmentis valde imbricatis tubo obconico 3–4-plo brevioribus. Filamenta ad medium tubi inserta, 8–9 lin. longa. *Australia* (*N. S. Wales*), (*v. v. in Hort. Veitch*).

5. B. FLAMMEA, *Lindl. Paxt. Mag.* xvi. t. 354; *Hook. fil. Bot. Mag.* t. 4819; *Journ. Hort.* ii. t. 1; *Flore des Serres,* vi. t. 585. Folia 12–18 poll. longa, 2–2½ lin. lata, margine serrulato-scabra, venis utrinque costæ 4–6. Flores 4–12, pedicellis infimis floriferis 9–15 lin. longis. Bracteæ lanceolatæ, acuminatæ, 3–4 lin. longæ. Perianthium flavum plus minus coccineo suffusum, 18–21 lin. longum, ore exsiccatum 1 poll. latum, segmentis valde imbricatis tubo spathulatim ampliato quadruplo brevioribus. Filamenta ad medium tubi inserta, 8–9 lin. longa. *Australia orientalis* (*lat.* 25°–39° *S.*), Backhouse ! Lady Parry ! C. Moore ! &c.

5. FUNKIA, *Spreng.*

Spreng. Syst. ii. 41; *Endl. Gen.* No. 1100; *Kunth, Enum.* iv. 590. —Hosta, *Tratt. Obs.* ii. 56; *Aschers, Bot. Zeit.* 1863, 52, *non Jacq.*—Niobe et Bryocles, *Salisb. Hort. Trans.* i. 335, *Gen.* 81, 82.—Libertia, *Dumort. Com.* 9, non *Spreng.*—Hemerocallidis sp., *Thunb., &c.*

Perianthium infundibuliforme, segmentis oblongo-spathulatis erectis tubo cylindrico subæquantibus. *Stamina* 6, hypogyna, filamentis filiformibus subæqualibus leviter incurvatis perianthio subæquantibus, antheris lineari-oblongis versatilibus. *Ovarium* sessile, oblongum, ovulis copiose biseriatis; *stylus* filiformis, leviter exsertus, extrorsum incurvatus; *stigma* capitatum. *Capsula* coriacea, lineari-oblonga, trigona, loculicide trivalvis, seminibus complanatis, testa nigra nitida. *Herbæ radicibus crasse fibrosis, foliis latis textura herbaceis, distincte nervatis, floribus magnis albis vel cæruleis in racemis laxis subsecundis dispositis, pedunculis elongatis sparse foliatis.*

§ NIOBE (Salisb.). *Bracteæ geminatæ; tubus centro 2 lin. crassus, sursum sensim ampliatus.*

Species sola .... 1. *subcordata.*

§ BRYOCLES (Salisb.). *Bracteæ solitariæ; tubus centro vix 1 lin. crassus, sursum cite ampliatus.*

Folia glauca, magna, venis utrinque costæ 12–13. 2. *Sieboldiana.*

Folia viridia, basi plerumque late rotundata vel subcordata, venis utrinque costæ 5–6 .... 3. *ovata.*

Folia viridia, lanceolata, basi angustata, venis utrinque costæ 3–4.................................... 4. *lancifolia.*

1. F. SUBCORDATA, *Spreng. Syst.* ii. 41; *Kunth,* iv. 591; *Miquel, Ann. Mus. Bat.* iii. 153; *Baker, Gard. Chron.* 1868, 1015.—Hemerocallis japonica, *Thunb. Linn. Trans.* ii. 335; *Red. Lil.* t. 3; *Bot. Mag.* t. 1433.—H. alba. *Andr. Bot. Rep.* t. 194.—H. plantaginea, *Lam.*—H. cordata, *Cav.*—F. grandiflora, *Sieb. Fl. des Serres,* t. 158, 159 (*forma hortensis elatior*).—Hosta japonica, *Tratt.* t. 52. Folia pallide viridia, cordato-ovata, 6–9 poll. longa, 3–5 poll. lata, petiolis 6–8 poll. longis, venis utrinque costæ 6–8 deorsum 6–7 lin. inter sese distantibus. Scapus 1½–2-pedalis. Racemus 9–15-florus. Bracteæ lanceolatæ, geminatæ, erecto-patentes, majores 1–2 poll. longæ. Pedicelli inferiores patentes 6–12 lin. longi. Perianthium album, 4–4½ poll. longum, tubo sursum sensim ampliato, segmentis 6–9 lin. latis. Capsula 2 poll. longa. 4 lin. crassa, utrinque sensim angustata. *Japonia,* Thunberg! &c.; *China borealis,* Sir G. Staunton!

2. F. SIEBOLDIANA, *Hook. Bot. Mag.* t. 3663 (*mala*); *Kunth, Enum.* iv. 592; *Miquel, Ann. Mus. Lug. Bat.* iii. 153; *Baker, Gard. Chron.* 1868, 1015.—Hemerocallis, *Loddige, Bot. Cab.* t. 1869.—F. Sieboldii, *Lindl. Bot. Reg.* 1839, t. 50 (*bona*). Folia utrinque glauca, late cordato-ovata, majora 10–12 poll. longa, 7–8 poll. lata, petiolis 8–12 poll. longis, venis utrinque costæ 12–13, deorsum inter sese 5–6 lin. distantibus. Racemus 10–15-florus cum scapo vix folia cum petiolo superans. Bracteæ solitariæ, inferiores 1½–3 poll. longæ, demum subpatentes. Pedicelli 5–6 lin. longi, inferiores cernui. Perianthium pallide lilacinum, 2–2½ poll. longum, tubo pergracili sursum cite ampliato, segmentis 3–4 lin. latis. Capsulæ pendulæ, 15–18 lin. longæ. *Japonia.*

3. F. OVATA, *Spreng. Syst.* ii. 240; *Baker, Gard. Chron.* 1868, 1015.—F. ovata *a, Kunth, Enum.* iv. 591; *Miquel, Ann. Mus. Lug. Bat.* iii. 153.—Hemerocallis cærulea, *Andrews, Bot. Rep.* t. 6; *Bot. Mag.* t. 894; *Vent. Hort. Malm.* t. 18; *Red. Lil.* t. 106.—Hosta cærulea, *Tratt. Tab.* t. 189; *Thes.* t. 51. Folia viridia, late, sæpe subcordato-

ovata, majora 5–9 poll. longa, 3–5 poll. lata, petiolis 4–12 poll. longis, venis utrinque costæ 6–8, deorsum 4–6 lin. inter sese distantibus. Scapus 1–1½-pedalis. Racemus laxus, 10–15-florus, cum scapum foliis cum petiolo longe superans. Bracteæ solitariæ, infimæ raro ultra 1 poll. longæ. Pedicelli 3–4 lin. longi, inferiores cernui. Perianthium pallide vel sæpe saturate lilacino-cæruleum, 1½–2 poll. longum, tubo pergracili sursum cite ampliato, segmentis 4–6 lin. latis. Capsulæ pendulæ, 12–18 lin. longæ. *Japonia*; *China borealis*; *Siberia orientalis.*

Var. *β.* INTERMEDIA, *Baker.* Æqualiter magna ac *a*, sed foliis duplo longioribus quam latis ovatis basi sensim subspathulatim angustatis, venis utrinque costæ 6, deorsum 3–4 lin. inter sese distantibus. *Japonia,* Wilford! Hodgson!—F. marginata, *Siebold,* est forma hujus varietatis foliis margine albo-cinctis.

Var. *γ.* MINOR, *Baker.* Multo minor, foliis ovatis 2½–3 poll. longis basi late rotundatis venis utrinque costæ 5–6 deorsum 2–2½ lin. inter sese distantibus, scapo foliis 5–6-plo longiore. *Insulæ Koreanæ,* Oldham, 865!

4. F. LANCIFOLIA, *Spreng. Syst.* ii. 41; *Baker, Gard. Chron.* 1868, 1015.—Hemerocallis, *Thunb. Linn. Trans.* ii. 335.—F. ovata *β*, *Kunth, Enum.* iv. 592; *Miquel, Ann. Mus. Lug. Bat.* iii. 153. Folia viridia, lanceolata, majora 4–5 poll. longa, 1½–2 poll. lata, petiolis 6–9 poll. longis, venis utrinque costæ 4–5, deorsum 3 lin. inter sese distantibus. Scapus subpedali. Racemus laxus, 6–10-florus. Bracteæ solitariæ. Pedicelli 2–3 poll. longi, inferiores cernui. Perianthium pallide lilacinum, 1–1½ poll. longum, tubo pergracili apice cite ampliato. Capsulæ pendulæ. *Japonia.*—F. albomarginata (*Hook. Bot. Mag.* t. 3663; *Kunth, Enum.* iv. 592) est forma magna hortensis hujus speciei foliis paullulum albo-cinctis. F. undulata (*Otto et Dietr. Gartenzeit.* 1833, p. 120, *Kunth, loc. cit.*) est forma altera hortensis foliis undulatis valde albo-variegatis petiolis reductis undulato-alatis.

6. AGAPANTHUS, *L'Hérit.*

L'Hérit. Sert. Angl. t. 18; *Endl. Gen.* 1102: *Kunth, Enum.* iv. 478; *Salisb. Gen.* 82: *Harv. Cap. Gen.* 2nd edit. 398.—Abumon, *Adans. Fam.* ii. 54.—Crini sp., *Linn.*—Mauhliæ sp., *Thunb.*

Perianthium infundibuliforme, tubo cylindrico sursum ampliato, segmentis oblongo-spathulatis æquilongis tubo subduplo longioribus, inferioribus demum laxis. *Stamina* 6, ad tubi faucem inserta, filamentis filiformibus subæqualibus segmentis paulo brevioribus extrorsum leviter declinatis, antheris lineari-oblongis versatilibus. *Ovarium* sessile, oblongo-triquetrum, ovulis copiosis; *stylus* filiformis, filamentis subæquans et cum eis incurvatus; *stigma* trisulcatum. *Capsula* subsessilis, clavato-triquetra, septicide trivalvis, seminibus in loculis copiosis, discoideis, uniseriatis, superne anguste alatis. *Testa* nigra, nitida. *Herbæ radicibus carnoso-fibrosis, foliis anguste loratis numerosis carnoso-herbaceis, floribus speciosis numerosis umbellatis, pedicellis apice articulatis.*

1. A. UMBELLATUS, *L'Hérit. Sert. Angl.* 18; *Ait. Kew.* i. 414; *Bot. Mag.* t. 500; *Redouté, Lil.* t. 4; *Kunth, Enum.* iv. 479.—Crinum africanum, *Linn.*—Mauhlia linearis, *Thunb.* Folia 6–8, 8–12 poll. longa, 6–8 lin. lata. Scapi foliis duplo longiores vel ultra. Umbellæ 12–30-floræ, pedicellis 9–15 lin. longis. Perianthium saturate cæruleum, 15–21 lin. longum, segmentis oblongo-spathulatis 3–3½ lin. latis, 2–3-plo longioribus. *Cap. B. Spei,* Masson! Sieber, 238! Zeyher, 4267! &c. In hortis sæpissime culta, foliis 10–20 sesqui- vel bipedalibus 18–24 lin. latis, scapo 2–3-pedali (var. *maximus, Bot. Reg.* xxix. t. 7.—A. multiflorus, *Willd. Enum.* 353; *Kunth, Enum.* iv. 480).

2. A. PRÆCOX, *Willd. Enum.* 353; *Kunth, Enum.* iv. 480.—A. umbellatus, var. minimus, *Lindl. Bot. Reg.* t. 699. Folia 6–8, pedalia, in planta sylvestri 5–6 lin. lata. Scapus bipedalis vel ultra. Umbellæ 30–40-floræ, pedicellis elongatis (2–2½ poll. longis). Perianthium pallide cæruleum, 12–14 lin. longum, tubo et segmentis angustioribus quam in præcedente. *Natal* (ad altit. 0–1000 pedum angl.), Dr. Sutherland! *Kaffraria,* Bowker! In hortis folia 12–20, 12–14 lin. lata; perianthium 2 poll. longum segmentis 4–4½ lin. latis, et floratio paullulum præcocior (ad finem Junii) quam in aliis.

3. A. MINOR, *Lodd. Bot. Cab.* t. 42 (*pessima*).—A. umbellatus, var. minor, *Redouté, Lil.* 403; *Kunth, Enum.* iv. 479. Folia 6–8, 4–6 poll. longa, 3–4 lin. lata. Scapi 12–18 poll. longi. Umbellæ 12–30-floræ, pedicellis 3–9 lin. longis. Perianthium pallide cæruleum. 6–9 lin. longum, segmentis oblongo-spathulatis tubo 3–4-plo longioribus. *Cap. B. Spei,* Masson, Milne! Dr. Hooker! Burchell, 7138! &c. In hortis folia 10–12, pedalia, ½ lin. lata, perianthium 15–18 lin. longum, segmentis 3–4 lin. latis. Species 2. et 3. vix ultra varietates.

7. TULBAGHIA, *Linn.*

Linn. Gen. 1300; *Endl. Gen.* 1159; *Kunth, Enum.* iv. 480; *Salisb. Gen.* 87; *Harv. Cap. Gen.* 2nd edit. 398.—Omentaria, *Salisb. Gen.* 87.

Perianthium infundibuliforme vel rotatum, tubo urceolato vel cylindrico, segmentis biseriatis subæqualibus lanceolatis vel linearibus erecto-patentibus, vel patentibus tubo subæqualibus vel brevioribus. *Antheræ* biseriatæ, subsessiles, oblongæ, in tubo vel corona insertæ. *Staminodia* faucem tubi coronantia, 3, discreta, integra vel emarginata, vel in coronam concreta. *Ovarium* sessile, oblongum, ovulis in loculis paucis (sæpe 5–8); *stylus* brevis, rectus; *stigma* capitatum, trisulcatum. *Capsula* sessilis, membranacea, obovoidea, loculicide trivalvis, seminibus in loculis paucis (2–6) oblanceolatis, parvis, exalatis, vix compressis. *Testa* nigra. *Herbæ radicibus crasse fibrosis, foliis numerosis anguste ligulatis, floribus parvis umbellatis, odore forti alliaceo.*

§ EUTULBAGHIA. *Stamina carnosa, in coronam concreta, raro sublibera.*

Staminodia profunde emarginata, libera vel basi solum connata. 1. *capensis.*
Staminodia in coronam integram vel crenatam concreta.
  Corona 1–1½ lin. alta.
    Folia carnoso-herbacea, 2–3 lin. lata vel ultra. 2. *alliacea.*
    Folia firma, filiformia, ½–1 lin. lata...... 3. *acutiloba.*
  Corona ½ lin. alta.
    Segmenta obtusa, coronam vix excedentia. 4. *Dregeana.*
    Segmenta linearia, corona 4–6-plo longiora. 5. *hypoxidea.*

§ OMENTARIA (Salisb.). *Staminodia parva, ligulata, inter sese omnino libera.*

Folia ½–1 lin. lata. Perianthium 5–6 lin. longum. 6. *cepacea.*
Folia 2–3 lin. lata. Perianthium 8–9 lin. longum. 7. *violacea.*

1. T. CAPENSIS. *Jacq. Hort. Vind.* ii. t. 115! *Linn. Mant.* 223.—T. alliacea, *Bot. Mag.* t. 806; *Kunth, Enum.* iv. 481. Folia 10–12, carnoso-herbacea, pedalia vel ultra, 4–6 lin. lata. Scapi 1½–2 pedes alti. Valvæ spathæ lanceolatæ, 6–9 lin. longæ. Umbellæ 6–8-floræ, pedicellis 9–12 lin. longis. Perianthium viridi-purpureum, segmentis lanceolatis basi 1 lin. latis, tubo 1½ lin. crasso duplo brevioribus. Staminodia obscure purpurea, segmentis subæqualia, profunde emarginata, basi concreta vel interdum inter se libera. *Cap. B. Spei*, Drège! &c. (*v. s. cult. in herb. Linn. & Banks. a Jaquinio missum*).

Var. β. GRACILIS, *Baker*. Minor, foliis 3–4 poll. longis, 2–3 lin. latis, scapo subpedali, tubo graciliore, segmentis limbi linearibus, tubo duplo brevioribus. *Cap. B. Spei*, Zeyher, 4268!

2. T. ALLIACEA, *Thunb. Prodr.* 60; *Fl. Cap.* 306; *Linn. Suppl.* 193, *non Kunth.*—T. brachystemma, *Kunth, Enum.* iv. 483. Folia 5–6, carnoso-herbacea, 6–9 poll. longa, 2–3 lin. lata. Scapi 9–18 poll. longi. Valvæ spathæ late lanceolatæ, 6–9 lin. longæ. Umbellæ 4–12-floræ, pedicellis flexuosis 6–15 lin. longis. Perianthium viridi-purpureum, 5–6 lin. longum, segmentis viridibus oblongis obtusis 1 lin. latis $1\frac{1}{2}$–2 lin. longis, tubo $1\frac{1}{2}$–2 lin. crasso. Corona carnosa, integra vel crenata, obscure rubra, 1–$1\frac{1}{2}$ lin. longa. Stamina ad basin coronæ biseriata. *Cap. B. Spei*, Drège! Macowan, 913! Bowker, 249! &c.; *Natal*, Fannin, 43! *Namaqua-land*, Rev. H. Whitehead! (*segmenta breviora*).

Var. β. AFFINIS, *Baker.*—T. affinis, *Link, Enum.* i. 310; *Kunth, Enum.* iv. 480. Robustior, foliis pedalibus vel ultra, 3–6 lin. latis, perianthio 5–6 lin. longo, segmentis tubo duplo brevioribus, angustioribus, acutioribus. *Kaffraria Britannica*, Mrs. Hutton! *Natal*, Sanderson, 429!

Var. γ. LUDWIGIANA, *Baker.*—T. Ludwigiana, *Harv. Bot. Mag.* t. 3547; *Kunth, Enum.* iv. 482. Folia lorata 6–8 poll. longa, 8–9 lin. lata. Scapi $1\frac{1}{2}$–2 pedales. Perianthium et coronæ typi. *Kaffraria Britannica*, Mrs. Hutton!

3. T. ACUTILOBA, *Harv. Thes. Cap.* t. 180. Folia 4–6, 2–3 poll. longa, firma, $\frac{1}{2}$–1 lin. lata. Scapi graciles, 6–12 poll. longi. Umbellæ 4–6-floræ, pedicellis 4–8 lin. longis. Valvæ spathæ lineares, 5–6 lin. longæ. Perianthium 4–5 lin. longum, viridi-purpureum, segmentis linearibus acutis $1\frac{1}{2}$–2 lin. longis, patentibus vel subreflexis tubo cylindrico $\frac{3}{4}$–1 lin. crasso sesquibrevioribus vel subæquantibus. Corona atro-purpurea, 1–$1\frac{1}{2}$ lin. longa, crenata. Stamina ad faucem tubi, biseriata. *Cap. B. Spei*, Zeyher, 262! Pappe! Harvey! Cooper, 463! &c.

Var. β. CURTA, *Baker.* Segmenta haud ultra 1 lin. longa, tubo triplo breviora. *Cap. B. Spei*, Drège, 2658, *ex parte*! 1516!

Var. γ. MAJOR, *Baker* (*Harv.* t. 180 *quoad flores*). Elatior, pedalis vel sesquipedalis, foliis 6–9 poll. longis, $1\frac{1}{2}$–2 lin. latis, perianthio 5–6 lin. longo, tubo $1\frac{1}{2}$ lin. crasso, segmentis linearibus $1\frac{1}{2}$–2 lin. longis. *Cap. B. Spei*, Zeyher, Burchell, 1829, 4465! *Natal*, Sanderson, 271! Fannin, 60! Inter typum et *T. alliaceam* medium tenens.

4. T. DREGEANA, *Kunth, Enum.* iv. 483. Folia 4–5, 4–6 poll. longa, 1 lin. lata. Scapi 6–12 poll. longi. Valvæ spathæ lanceolatæ, 3–4 lin. longæ. Umbellæ 4–8-floræ, pedicellis 4–8 lin. longis. Perianthium 3–4 lin. longum, viridi-purpureum, tubo cylindrico $\frac{1}{2}$ lin. crasso, segmentis oblongo-deltoideis obtusis $\frac{1}{2}$ lin. longis. Corona crenata,

laciniis vix brevior. Stamina ad faucem tubi biseriata. *Cap. B. Spei*, Drège, 2658, *ex parte* ! Zeyher, 645 !

5. T. HYPOXIDEA, *Smith in Rees's Cylop.*; *Kunth, Enum.* iv. 482. Folia subpedalia, 2–3 lin. lata. Scapi foliis subæquantes. Umbellæ 6–8-floræ, pedicellis 8–12 lin. longis. Perianthium 6 lin. longum, segmentis linearibus acuminatis tubo subæquantibus. Corona subintegra, segmentis 4–6-plo brevior. *Cap. B. Spei* (*v. s. cult. in herb. Smithii*).

6. T. CEPACEA, *Thunb. Prodr.* 60; *Linn. Suppl.* 194; *Willd. Sp.* ii. 34; *Kunth, Enum.* iv. 484 (*excl. β*).—Omentaria cepacea, *Salisb. Gen.* 87. Folia 4–5, 4–6 poll. longa, ½–1 lin. lata. Scapi 6–12 poll. longi. Valvæ spathæ lanceolatæ, 4–6 lin. longæ. Umbellæ 6–12-floræ, pedicellis 3–6 lin. longis. Perianthium purpureum, 5–6 lin. longum, segmentis lanceolatis vel oblongis acutis vel subobtusis tubo cylindrico ½ lin. crasso duplo brevioribus. Staminodia 3, 1 lin. longa, ligulato-lanceolata, integra vel emarginata. Stamina ad medium et faucem tubi inserta. *Cap. B. Spei*, Thunberg ! Masson ! Drège ! Burchell, 4741 ! Ecklon et Zeyher ! &c.

7. T. VIOLACEA, *Harv. in Hook. Bot. Mag.* t. 3555; *Kunth, Enum.* iv. 485. Folia 6–10, carnoso-herbacea, viridia, 8–12 poll. longa, 2–3 lin. lata. Scapi 1–2 pedes longi. Valvæ spathæ lanceolatæ, 6–9 lin. longæ. Umbellæ 8–20-floræ, pedicellis 3–18 lin. longis. Perianthium saturate purpureo-violaceum, 8–9 lin. longum, segmentis lanceolatis tubo cylindrico 1 lin. crasso duplo brevioribus. Staminodia ligulata, 1–1½ lin. longa, emarginata. Stamina ad faucem et medium tubi inserta. *Cap. B. Spei*, Harvey ! Macowan, 914 ! Bowker ! Bunbury ! &c. *Kaffraria Britannica*, Cooper, 544 ! *ad ripas fluv. Orange*, Burke !

Var. β. MINOR, *Baker*. Multo minor, scapi 3–4 poll. longi; umbellæ 5–6-floræ, pedicellis 2–3 lin. longis: perianthium 5–6 lin. longum, segmentis lanceolatis acutis. *Kaffraria, ad montes*, Mrs. Barber, 41 !

Var. γ. OBTUSA, *Baker*.—T. cepacea, var. robustior, *Kunth, Enum.* iv. 484. Statura et folia plantæ typicæ; perianthium 7–8 lin. longum, tubo crassiore, segmentis oblongis obtusis, staminodiis longioribus. *Cap. B. Spei*, Drège !

8. ANDROSTEPHIUM, *Torrey*.

Torrey, Bot. Mex. Bound. 218.—Millæ sp. *Scheele, Linnæa*, xxv. 260; *Walp. Ann.* vi. 219.

Perianthium infundibuliforme, segmentis lanceolato-spathulatis flore expanso subpatentibus tubo infundibuliformi æquantibus. *Stamina* 6, *filamentis* in coronam ad faucem tubi insertam segmentis breviorem prorsus concretis, *antheris* lineari-oblongis versatilibus. *Ovarium* sessile, oblongo-triquetrum, loculis 12–14-ovulatis; *stylus* rectus filiformis; *stigma* capitatum, trisulcatum. *Capsula* membranacea, sessilis, obovoidea, triquetra, loculicide trivalvis, seminibus in loculis pluribus, subcompressis; *testa* nigra, nitida. *Herba bulbosa habitu omnino* Millæ.

1. A. VIOLACEUM, *Torrey, loc. cit.*—Milla cærulea, *Scheele, Linnæa, loc. cit.* Bulbus globosus, tunicatus, 8–9 lin. crassus, membranis externis seorsum productis. Folia 4–6, synanthia, 6–8 poll. longa, vix ultra ½ lin. lata. Scapi 2–4 poll. longi. Valvæ spathæ 3–4, lanceolatæ, membranaceæ. Umbellæ 3–4-floræ, pedicellis 6–12 lin. longis. Perianthium violaceum, 10–12 lin. longum. Corona 3 lin. longa. Stylus 5–6 lin. longus, ultra coronam haud exsertus. Segmenta limbi 2–2½ lin. lata. *Texas*, Lindheimer 544! C. Wright, &c.

9. BESSERA, *Schult. fil.*

Schult. fil. Linnæa, iv. 121; *Syst.* vii. 58 et 996; *Endl. Gen.* 1112; *Kunth, Enum.* iv. 477 et 699; *Benth. Pl. Hartw.* 26.—Pharium, *Herbert, Bot. Reg.* t. 1546.

Perianthium late infundibuliforme, segmentis oblongo-lanceolatis erecto-patentibus tubo campanulato 4–6-plo longioribus. *Stamina* 6, *filamentis* exsertis extrorsum leviter incurvatis pro dimidio superiore filiformibus liberis, pro dimidio inferiore in coronam ad faucem tubi insertam concretis, *antheris* lineari-oblongis versatilibus. *Ovarium* sessile, oblongo-trigonum, loculis 15–25-ovulatis; *stylus* filiformis, staminibus æquans et cum eis paullulum incurvatus; *stigma* capitatum, trisulcatum. *Capsula* sessilis, membranacea, oblonga, obtuse trigona, septicide trivalvis, seminibus in loculis pluribus complanatis. *Testa* nigra, membranacea. *Herba bulbosa foliis paucis carnoso-herbaceis subteretibus post scapum maturis, floribus speciosis umbellatis pedicellis apice haud articulatis.*

1. B. ELEGANS, *Schult. fil. loc. cit.*; *Lindl. Bot. Reg.* 1839, t. 34; *Kunth, loc. cit.*—Pharium fistulosum, *Herbert, Bot. Reg.* t. 1546. Bulbus globosus, 1 poll. crassus, tunicatus, membranis externis seorsum circa basin scapi et foliorum productis. Folia 2–3, demum 10–12 poll. vel ultra longa. Scapus 1–2-pedalis, fistulosus, fragilis. Valvæ spathæ 3–4, membranaceæ, lanceolatæ, 3–4 lin. longæ. Umbellæ 4–10-floræ, pedicellis gracilibus 12–18 lin. longis. Perianthium 9–10 lin. longum, saturate rubrum, segmentis viridi carinatis 3–4 lin. latis. Corona 4 lin. longa, glabra vel scabra, filamentis deorsum an-

guste alatis. Stylus demum 9–10 lin. longus. *Mexico*, Hartweg, 232! Bates! Karwinsky! *&c.*—P. fistulosum, *Herbert, loc. cit.*, est forma filamentis scabris, corona inter basin filamentorum margine dentata.—B. multiflora, *Mart. et Gal. Enum.* 14; *Kunth, Enum.* iv. 699, est verisimiliter forma robustior multiflora.

10. LEUCOCORYNE, *Lindl.*

Lindl. Bot. Reg. t. 1293; *Endl. Gen.* 1105; *Kunth, Enum.* iv. 472.—Brodiææ sp., *Hook. &c.*—Anthoceras, *Bertero, MSS.*

Perianthium infundibuliforme vel subrotatum, segmentis æqualibus lanceolatis vel linearibus tubo cylindrico subæquantibus vel brevioribus. *Stamina* 3, ad medium tubi inserta, *filamentis* brevissimis, *antheris* lineari-oblongis dorsifixis. *Staminodia* 3, ad faucem tubi inserta, calcarata, erecta, segmentis æquantia vel breviora, rarissime antherifera. *Ovarium* subsessile, oblongum, obtuse trigonum, loculis multiovulatis; *stylus* brevis, rectus; *stigma* capitatum. *Capsula* subsessilis, membranacea, oblonga, obtuse trigona, loculicide trivalvis, seminibus in loculis pluribus (5–6) parvis triquetris. *Testa* nigra, membranacea. *Herbæ bulbosæ foliis pluribus synanthiis anguste linearibus, floribus umbellatis, spathis bivalvatis, pedicellis haud articulatis.*

Staminodia segmentis lanceolato-spathulatis 3–4-plo breviora. 1. *ixioides.*
Staminodia segmentis linearibus acuminatis subæquantia.
  Segmenta tubo paullulum longiora.
    Perianthium 8–9 lin. longum .... 2. *alliacea.*
    Perianthium 5–6 lin. longum .... 3. *angustipetala.*
  Segmenta tubo duplo breviora .... 4. *Gayi.*

1. L. IXIOIDES, *Lindl. Bot. Reg. sub* t. 1293; *Kunth, Enum.* iv. 473; *C. Gay, Fl. Chil.* vi. 121.—Brodiæa ixioides, *Hook. Bot. Mag.* t. 2382. —L. odorata, *Lind. Bot. Reg.* t. 1293; *Kunth et C. Gay, loc. cit.*—Anthoceras odorata, *Bertero, MSS.*—L. narcissiflora, *Phil. Flor. Atacam.* 52. Bulbus 6–9 lin. crassus, brunneo-tunicatus, membranis externis basin scapi et foliorum arcte cingentibus. Folia plurima, viridia, carnoso-herbacea, 8–12 poll. longa, 1 lin. lata, evanescentia. Scapi erecti, fragiles, fistulosi, 12–18 lin. longi. Valvæ spathæ lineari-acuminatæ, 12–15 lin. longæ. Umbellæ 3–12-floræ, pedicellis 9–18 lin. longis. Perianthium 9–15 lin. longum, pallide lilacinum, segmentis lanceolato-spathulatis 2½-3-lin. latis. Staminodia segmentis 3–4-plo breviora. *Chili, copiose prope urbem Valparaiso, &c.* Cuming 557! Bertero 806! Menzies 290! Bridges 75! C. Gay! Philippi, *&c. Guilli incolis dictum,*

Andes Peruvianæ, Bollaert! *L. odorata* est mera forma pedicellis brevioribus.

Var. *β*. PURPUREA, *Baker*.—L. purpurea, *C. Gay, Fl. Chil.* vi. 122; *Atlas*, t. 68. Elatior, perianthio 15–18 lin. longo tubo saturate purpureo segmentis obtusioribus 3–4 lin. latis. *Chili*, C. Gay!

2. L. ALLIACEA, *Lindl. Bot. Reg. sub* t. 1293; *Hook. et Arn. Bot. Beech.* 48; *Kunth, Enum.* iv. 474; *C. Gay, Fl. Chil.* vi. 123.—Brodiæa alliacea, *Miers, MSS.*—Anthoceras ornithogaloides, *Bertero, MSS.* Bulbus ovoideus, 9–12 lin. crassus, brunneo-truncatus, membranis externis basin scapi et foliorum arcte longe cingentibus. Folia plurima, firmiora, viridia, 6–8 poll. longa, vix 1 lin. lata. Scapi 6–12 poll. longi. Valvæ spathæ lineari-acuminatæ, 1 poll. vel ultra longæ. Umbellæ 2–4-floræ, pedicellis 3–24 lin. longis. Perianthium 8–9 lin. longum, pallide lilacinum, segmentis linearibus acutis tubo longioribus. Staminodia segmentis paullulum breviora (3–4 lin. longa). *Chili*, Bertero! Macrae! Philippi 654! Germain! *&c.*

3. L. ANGUSTIPETALA, *C. Gay, Fl. Chil.* vi. 124. Bulbus 8–9 lin. crassus, brunneo-tunicatus, membranis externis seorsum productis. Folia plurima, firmiora, 3–4 poll. longa, vix 1 lin. lata. Scapi 3–4 poll. longi. Valvæ spathæ 8–9 lin. longæ. Umbellæ 3–4-floræ, pedicellis 3–6 lin. longis. Perianthium 5–6 lin. longum, pallide purpureum, segmentis linearibus acutis tubum paullulo excedentibus. Staminodia segmentis æquantia. *Chili*, Philippi!

4. L. GAYI, *Baker*.—Tristagma dimorphopetala, *C. Gay, Fl. Chil.* vi. 126; *Atlas*, t. 69 bis. Bulbum non vidi, membranis externis longe circa basin scapum cingentibus. Folia 6–9 poll. longa, carnoso-herbacea, 1½ lin. lata. Scapi fragiles, fistulosi, 8–12 poll. longi. Valvæ spathæ lanceolatæ, seorsum attenuatæ, 12–15 lin. longæ. Umbellæ 6–8-floræ, pedicellis 1–3 poll. longis. Perianthium 5–6 lin. longum, segmentis anguste linearibus tubo duplo brevioribus. Staminodia segmentis subæquantia. *Chili*, C. Gay! Petala difformia suspicata sunt staminodia generis.

11. BRODIÆA, *Smith*.

Smith, Linn. Trans. x. 2, t. 1; *Endl. Gen.* 1106; *Hooker, Fl. Bor. Amer.* ii. 186; *Kunth, Enum.* iv. 470.—Hookera, *Salisb. Parad. Lond.* t. 98.—Dichelostemma, *Kunth, Enum.* iv. 469.—Stropholirion, *Torrey, Bot. Pac. Rail.* iv. 149.—Brevoortia, *Wood, Proc. Phil. Acad.* 1867, 173.

Perianthium infundibuliforme vel late tubulosum, segmentis plerisque tubo longioribus vel subæquantibus, raro brevioribus. *Antheræ* 3, lineares, ad faucem tubi sessiles vel subsessiles, exalatæ vel alatæ. *Staminodia* 3, complanata, membranacea, cum staminibus uniseriata. *Ovarium* sessile vel stipitatum, loculis 4–6-ovulatis; *stylus* rectus, filiformis; *stigma* capitatum. *Capsula* membranacea, oblongo-trigona, sessilis vel stipitata, loculicide trivalvis, seminibus in loculis 2–4 parvis triquetris. *Testa* nigra, membranacea. *Herbæ bulbosæ floribus speciosis umbellatis spathis multivalvatis pedicellis apice articulatis, scapo in specie una longe volubili.*

§ EUBRODIÆA. *Scapi erecti. Perianthium infundibuliforme, segmentis tubo æquantibus vel excedentibus. Antheræ exalatæ.*

Umbellæ laxæ, pedicellis elongatis. Ovarium stipitatum. 1. *grandiflora.*

Umbellæ densæ, pedicellis brevibus vel subnullis. Ovarium sessile.

Staminodia quadrata, bifida . . . . 2. *congesta.*

Staminodia lanceolata, integra . . . . 3. *multiflora.*

§ STROPHOLIRION (Torrey). *Scapi longe volubiles. Perianthium infundibuliforme, segmentis tubo subæquantibus. Antheræ alatæ.*

Species sola . . . . 4. *volubilis.*

§ BREVOORTIA (Wood). *Scapi erecti. Perianthium late tubulosum, basi 6-saccatum, segmentis tubo quadruplo brevioribus. Antheræ exalatæ.*

Species sola . . . . 5. *coccinea.*

1. B. GRANDIFLORA, *Smith, Linn. Trans.* x. 2; *Lindl. Bot. Reg.* t. 1183; *Hook. Bot. Mag.* t. 2877; *Kunth, Enum.* iv. 471; *Wood, Proc. Acad. Phil.* 1867, 172, *non Nuttall nec Pursh.*—Hookera coronaria, *Salisb. Par.* t. 98. Bulbus globosus, 8–9 lin. crassus, brunneo-tunicatus, membranis externis seorsum productis. Folia 4–6, ante scapum matura, 6–12 poll. longa, 1½ lin. lata, subteretia, facie concava, saturate viridia, subglauca, evanescentia. Scapus erectus, fistulosus, fragilis, 6–18 poll. altus. Valvæ spathæ plurimæ, lineares, 4–6 lin. longæ. Umbellæ 2–8-floræ, pedicellis inæqualibus 3–18 lin. longis. Perianthium 9–15 lin. longum, violaceum, segmentis oblongo-lanceolatis tubum ore 1½–2 lin. crassum excedentibus. Antheræ 3 lin. longæ, filamentis filiformibus triplo brevioribus ad faucem tubi insertis. Staminodia ligulata, flavida, subintegra, antheris æquantia. Ovarium breviter stipitatum, stylo filiformi 3–4 lin. longo. Semina in loculo 3–4. *Insulæ Vancouver et St. Juan,* Lyall! Wood! *Oregon et Columbia Britannica,* Menzies! Gairdner! Lyall! *California,* Douglas! Coulter 742! Hartweg 2002!

Var. β. MACROPODA, *Torrey, Bot. Whipple,* 93.—B. Torreyi, *Wood, Proc. Phil. Acad.* 1867, 172. Scapus brevissimus vel subnullus. Pedicelli elongati, 3–6 poll. longi. *California, in locis paludosis,* Bigelow ! Wood.

Var. γ. MAJOR, *Benth. MSS.*—B. californica, *Lindl. Trans. Hort. Soc.* iv. 84, *cum icone.* Elatior, robustior, perianthio 18–21 lin. longo, tubo ore 3–4 lin. crasso segmentis 12–15 lin. longis, pedicellis 6–24 lin. longis. *California,* Hartweg 1999 ! Fremont ! Jeffray 1124 !

2. B. CONGESTA, *Smith, Linn. Trans.* x. 3, t. 1; *Hook. Fl. Bor. Am.* ii. 186.—Dichelostemma congestum, *Kunth, Enum.* iv. 470; *Wood, Proc. Phil.* 1867, 173.—Hookera pulchella, *Salisb. Par.* t. 117? Bulbus globosus, brunneo-tunicatus, 8–9 lin. crassus. Folia 3–4, ante scapum matura, carnoso-herbacea, evanescentia, pedalia vel ultra, 1½–2 lin. lata, subteretia, facie valde concava, glauca. Scapus fragilis, fistulosus, 1–2-pedalis. Valvæ spathæ 3–4, lanceolatæ, 6–9 lin. longæ. Umbellæ 6–12-floræ, congestæ, pedicellis subnullis vel 1–3 lin. longis. Perianthium 8–9 lin. longum, saturate violaceo-cæruleum, segmentis oblongo-lanceolatis tubo 3 ore lin. crasso subæquantibus. Stamina 3, sessilia, 2½ lin. lata, apice profunde emarginata. Staminodia 3, cucullata, profunde emarginata. Ovarium sessile, stylo filiformi 2 lin. longo. Semina in loculo 5–6. *E Columbia Britannica ad Californiam borealem,* Menzies ! Douglas ! &c.

3. B. MULTIFLORA, *Benth. Pl. Hartweg.* 339.—B. parviflora, *Torrey et Gray Bot. Pac. Rail.* p. 125; *Wood, Proc. Phil. Acad.* 1867, 172. Bulbus fibroso-tunicatus, 1 poll. vel ultra crassus. Folia carnoso-herbacea, firmiora, 12–18 poll. longa, 1½–2 lin. lata. Scapus fragilis, 1–2 pedes longus. Valvæ spathæ plurimæ, late lanceolatæ, 4–6 lin. longæ. Umbellæ congestæ, 6–20-floræ, pedicellis subnullis vel 3–6 lin. longis. Perianthium 8–10 lin. longum, cæruleum, segmentis oblongo-lanceolatis tubo ventricoso subæquantibns. Stamina sessilia 2 lin. longa. Staminodia lanceolata, integra, 1½ lin. longa. Ovarium sessile, stylo 2½ lin. longo. Semina in loculo 4–6. *California,* Hartweg 2001 ! Jeffray 1125 ! Lobb 237 ! Bridges 276 ! *Utah,* Fremont !

4. B. VOLUBILIS, *Baker.*—Stropholirion californicum, *Torrey, Bot. Pac. Rail.* iv. 149; *Bot. Whipple,* t. 23.—Rupalleya volubilis, *Morière, Bull. Soc. Linn. Norm.* viii. *cum icone ex Bull. Soc. Bot. France,* xi. *Bibl.* 25.—Dichelostemma Californica, *Wood, Proc. Phil.* 1867, 173. Folia synanthia, carnoso-herbacea, 12–18 poll. longa, 3–4 lin. lata. Scapi volubiles, 4–12-pedales. Valvæ spathæ 4-5, lanceolatæ. Umbellæ 15–20-floræ, pedicellis 3–9 lin. longis. Perianthium roseo-purpureum, 5–6 lin. longum, segmentis oblongo-lanceolatis tubum ventricosum paullulo excedentibus. Staminodia ligulata, emarginata. Antheræ sessiles, emarginato-alatæ, 1½ lin. longæ. Ovarium breviter

stipitatum, loculis 3–4-ovulatis, stylo filiformi 1½ lin. longo. Semina in loculo sæpe solitaria. *California*, Hartweg 1992! Bigelow! Bridges 277! *&c.*

5. B. COCCINEA, *A. Gray, Proc. Amer. Acad.* 1867, 389.—Brevoortia Ida-Maia, *Wood, Proc. Phil. Acad.* 1867, 173. Folia carnoso-herbacea, pedalia vel ultra, 2–3 lin. lata, ante scapum evanescentia, glauca. Scapi fragiles, erecti, 2–3 pedes longi. Valvæ spathæ 4–6, membranaceæ, lanceolatæ vel lineares, saturate rubræ, 6–12 lin. longæ. Umbellæ 4–12-floræ, pedicellis 8–12 lin. longis. Perianthium 12–16 lin. longum, tubulosum, basi 6-saccato, tubo 3–4 lin. crasso saturate coccineo, segmentis lanceolato-oblongis, flavidis, 2½–3 lin. longis flore expanso patentibus. Ovarium oblongum, distincte stipitatum, loculis 4–6-ovulatis; stylus filiformis, 8–9 lin. longus, interdum subexsertus. Antheræ lineares, basi emarginatæ, segmentis subæquantes, Staminodia flavida, latissima, quadrata, dentata, antheris duplo breviora. *California*, W. Lobb! Bolander! *v. v. ex hort. Thompson.*

12. MILLA, *Cav.*

Cav. Icon. ii. 76, t. 196; *Endl. Gen.* 1109; *Kunth, Enum.* iv. 278.—Triteleia, *Dougl. in Lindl. Bot. Reg. sub* t. 1293; *Endl. Gen.* 1107; *Kunth, Enum.* iv. 465.—Seubertia, *Kunth, Enum.* iv. 475.—Hesperoscordium, *Lindl. Bot. Reg. sub* t. 1293; *Endl. Gen.* 1110; *Kunth, Enum.* iv. 464.—Calliprora, *Lindl. Bot. Reg.* t. 1590; *Endl. Gen.* 1111; *Kunth, Enum.* iv. 476. —Themis, *Salisb. Gen.* 85.

Perianthium late vel anguste infundibuliforme vel subrotatum, segmentis tubo infundibuliformi vel campanulato subæquantibus, vel 2–4-plo longioribus, vel raro brevioribus. *Stamina* 6, semper distincte perigyna, uniseriata vel plus minus distincte biseriata, filamentis plerisque elongatis raro subnullis, antheris lineari-oblongis versatilibus. *Ovarium* obovoideum, sessile vel plus minus distincte stipitatum; *stylus* rectus, filiformis; *stigma* capitatum, trisulcatum. *Capsula* membranacea, sessilis vel stipitata, loculicide trivalvis, seminibus in loculis 2–12 parvis triquetris laxis vel biseriatis. *Testa* nitida, nigra. *Herbæ bulbosæ foliis angustis synanthiis floribus umbellatis.*

§ BRODIÆOPSIS, Baker. *Tubus late infundibuliformis, segmenta superans. Stamina e basi et medio segmentorum biseriata.*

Species sola . . . . 1. *grandiflora.*

§ EUMILLA. *Tubus infundibuliformis, segmentis 1½–2-plo brevior. Stamina e fauce tubi uniseriata.*

Stamina sessilia vel subsessilia.
Flores 1–4 pedicellis elongatis. Stamina exalata. 2. *biflora.*
Flores 5–9 pedicellis subnullis vel perbrevibus. Stamina alterna emarginato-alata .... 3. *capitata.*
Filamenta 2–3 lin. longa.
Ovarium sessile, loculis 6–8-ovulatis ...... 4. *andicola.*
Ovarium stipitatum, loculis 10–12-ovulatis. 5. *macrostemon.*

§ TRITELEIA (Dougl.). *Tubus infundibuliformis, segmentis æquans vel 1½–2-plo brevior, vel raro excedens. Stamina distincte biseriata, in tubo inserta.*

Pedicelli apice inarticulati. Ovarium sessile (*Amer. merid.*).
Scapi uniflori.
Segmenta linearia tubo duplo breviora .. 6. *sessiliflora.*
Segmenta tubo subæquantia. Perianthium pallide lilacinum.
Folia filiformia; segmenta linearia .... 7. *patagonica.*
Folia plana; segmenta lanceolata vel oblonga. 8. *uniflora.*
Segmenta tubum duplo superantia. Perianthium flavum. 9. *Sellowiana.*
Scapi bi- vel multiflori.
Segmenta linearia, tubo cylindrico duplo breviora. 10. *nivalis.*
Segmenta oblonga, tubo infundibuliformi subæquantia. 11. *Poppigiana.*
Pedicelli apice articulati. Umbellæ multifloræ. Ovarium longe stipitatum (*Amer. bor.*).
Filamenta elongata, basi utrinque alata (*Calliprora*, Lindl.). 12. *ixioides.*
Filamenta brevissima, exalata vel nulla (*Seubertia*, Kunth).
Perianthium cæruleum, 15–18 lin. longum. 13. *laxa.*
Perianthium cæruleum, 8–9 lin. longum .. 14. *peduncularis.*
Perianthium flavum, 9 lin. longum ...... 15. *crocea.*

§ HESPEROCORDIUM (Lindl.). *Tubus campanulatus, segmentis 3–4-plo brevior. Stamina in tubo plus minusve distincte biseriatim inserta.*

Pedicelli apice articulati. Ovarium longe stipitatum (*Amer. bor.*) .... 16. *hyacinthina.*

Pedicelli apice haud articulati. Ovarium sessile (*Amer. merid.*).
Scapi semper uniflori. Folia setacea.
Perianthium album scapo glabro .... 17. *setacea.*
Perianthium flavum scapo hirtello ...... 18. *hirtella.*
Scapi 1–2-flori. Folia ½ lin. lata .... 19. *subbiflora.*
Scapi 2–6-flori.
Perianthium album. Folia 1–2 lin. lata.
Pedicelli vix 1 lin. longi .... 20. *brevipes.*
Pedicelli 6–12 lin. longi.
Perianthium 6–7 lin. longum, segmentis oblongis. 21. *bivalvis.*
Perianthium 9–10 lin. longum, segmentis lanceolatis acutis .... 22. *porrifolia.*
Perianthium flavum. Folia ½ lin. lata .. 23. *aurea.*

1. M. GRANDIFLORA, *Baker.*—Triteleia grandiflora, *Lindl. Bot. Reg. sub* t. 1293 & 1685; *Hook. Fl. Bor. Am.* ii. 186, t. 198 B; *Wood, Proc. Acad. Phil.* 1867, 171. Bulbus globosus, 1 poll. crassus, fibroso-tunicatus, edulis. Folia synanthia, carnoso-herbacea, pedalia vel ultra, 3–4 lin. lata. Scapi 1½–2 pedes alti. Valvæ spathæ plurimæ, lanceolatæ, 6–8 lin. longæ. Umbellæ 6–20-floræ, pedicellis apice articulatis 6–18 lin. longis. Perianthium saturate cæruleum, 8–10 lin. longum, segmentis oblongo-spathulatis obtusis erectis tubo late infundibuliformi ore 3–4 lin. crasso paullulum brevioribus. Antheræ 1 lin. longæ biseriatæ, inferiores ad faucem tubi sessiles, superiores ad medium segmentorum insertæ, filamentis filiformibus brevibus. Ovarium distincte stipitatum, loculis 6–8-ovulatis, stylo filiformi 1½–2 lin. longo. *Columbia Britannica, Oregon et Missouri,* Douglas! Burke! Geyer, 289! Lyall! &c.

2. M. BIFLORA, *Cav. Ic.* ii. 76, t. 196; *Willd. Sp. Plant.* ii. 62; *Lindl. Bot. Reg.* 78, t. 1555; *Kunth, Enum.* iv. 478; *Flore des Serres,* t. 1459. Bulbus globosus, brunneo-tunicatus, 6–9 lin. crassus, membranis externis seorsum productis. Folia 4–6, filiformia, 6–12 poll. longa. Scapus fragilis, 6–18 poll. longus. Flores 1–4, pedicellis strictis 2–6 poll. longis apice incrassatis. Valvæ spathæ plurimæ, lineares, 3–6 lin. longæ. Perianthium albidum, 15–18 lin. longum, segmentis oblongo-lanceolatis, carina viridi firmiore, tubo infundibuliformi ore 1½ lin. crasso subduplo longioribus, interioribus angustioribus. Stamina ad faucem uniseriata, 2–2½ lin. longa, subsessilia, exalata. Ovarium oblongum, stipite brevi obconico, stylo filiformi 5–6 lin. longo. Semina in loculo 5–9. *Mexico,* Pavon! Schaffner! Hartweg, 233! Galeotti, 5508! Graham, 359! Coulter, 1545! &c.; *Nova Mexico,* C. Wright, 1913!

3. M. CAPITATA, *Baker*.—Brodiæa capitata, *Benth. Pl. Hartw.* 339.—Dichelostemma capitata, *Wood, Proc. Acad. Phil.* 1868, 173. Bulbus edulis, proliferus, globosus, 6–9 lin. crassus, brunneo-tunicatus, membranis externis paullulum productis. Folia carnoso-herbacea, pedalia vel ultra, glauca, 2 lin. lata, evanescentia. Scapi fragiles, 1–2 pedes alti. Valvæ spathæ plurimæ, lanceolatæ, violaceæ, 5–6 lin. longæ. Umbellæ congestæ, 5–9-floræ, pedicellis subnullis vel 1–3 lin. longis. Perianthium 7–8 lin. longum, saturate lilacino-cæruleum, segmentis oblongo-lanceolatis erectis, tubum 2–2½ lin. crassum paullulo excedentibus. Stamina 1½ lin. longa ad faucem sessilia, alterna emarginato-alata. Ovarium basi angustatum, stylo 2 lin. longo. Semina in loculo 8–9. *California*, Hartweg, 2600! Bigelow! Jeffray, 1026! Douglas! Coulter, 743!

Var. *β*. PAUCIFLORA, *Torrey, Bot. Mex. Bound.* 218. Umbellæ 2–4-floræ, pedicellis spathæ valvis subduplo longioribus. *Novo-Mexico*, Bigelow; *Sonora*, Capt. E. K. Smith! *ad ripas fluv. Gila*, Parry.

Habitu *Brodiæam congestam* et *multifloram* arcte simulat: differt indole staminum.

4. M. ANDICOLA, *Baker*.—Nothoscordum andicola, *Kunth, Enum.* iv. 463. Bulbus 1 poll. crassus, brunneo-tunicatus, membranis externis circa basin scapi et foliorum longe productis. Folia 5–6, carnoso-herbacea, modice diuturna, scapos superantia, ½ lin. lata. Scapi firmi, 3–6 poll. longi. Valvæ spathæ 2, oppositæ, lanceolatæ, basi connatæ, 6–8 lin. longæ. Umbellæ 6–10-floræ, pedicellis 3–6 lin. longis apice haud articulatis. Perianthium 5–6 lin. longum, pallide lilacinum, segmentis lanceolato-spathulatis erecto-patentibus tubo ore 1–1¼ lin. crasso duplo longioribus. Stamina e fauce uniseriata, filamentis 2 lin. longis deorsum applanatis. Ovarium sessile, loculis 6–8-ovulatis, stylo 2 lin. longo. *Andes Peruviæ et Boliviæ ad ripas lacus Titicaca*, Meyen, Pentland!

5. M. MACROSTEMON, *Baker*.—Nothoscordum macrostemon, *Kunth, Enum.* iv. 463.—Sowerbæa americana, *Spreng. MSS.* Bulbum non vidi. Folia carnoso-herbacea, subpedalia, 2–2½ lin. lata. Scapi 1½–2 pedes longi, basi interdum 3 lin. crassi. Valvæ spathæ 2–3, lanceolatæ, 6–10 lin. longæ. Umbellæ 12–20-floræ, pedicellis 6–30 lin. longis. Perianthium 7–9 lin. longum, pallide lilacinum, segmentis lanceolato-spathulatis flore expanso erecto-patentibus tubo infundibuliformi ore 1½ lin. crasso duplo longioribus. Stamina e fauce uniseriata, filamentis 2½–3 lin. longis, præcipue dimidio superiore applanatis, antheris oblongis vix ultra ½ lin. longis. Ovarium basi in stipitem brevem sensim angustatum, loculis 10–12-ovulatis, stylo lin. longo. *Montevideo*, teste Kunth; *Brasilia meridionalis*; *St. Jago del Esterra*, Tweedie, 1393! 1394!

Var. *β*. GRACILIS, *Baker*. Gracilior, pedicellis 6–10 lin. longis, perianthio 6 lin. longo, tubo angustiore, ovario stipite gracili demum 1½ lin. longo. *Montevideo,* Capt. King! Verisimiliter species vera sed bulbum et folia non vidi.

6. M. SESSILIFLORA, *Baker.*—Triteleia sessilis, *Philippi, MSS.* Bulbus ovoideus, 3–4 lin. crassus, membranaceo-tunicatus, membranis externis longe productis. Folia 4–5, synanthia, carnoso-herbacea, filiformia, florem superantia. Scapus 12–15 lin. longus. Valvæ spathæ 2, lineares, deorsum longe connatæ. Flores solitarii, in spathis sessiles, albidi, 9–10 lin. longi, segmentis ascendentibus lanceolatis tubo pergracili 2–3-plo brevioribus. Stamina supra medium tubi biseriatim inserta, filamentis filiformibus antheras oblongas 3–4-plo excedentibus. Ovarium sessile, stylo 5–6 lin. longo. *Chili,* Philippi! Germain!

7. M. PATAGONICA, *Baker.* Bulbum non vidi. Folia 4–5, synanthia, filiformia, modice firma, 6–9 poll. longa. Scapi uniflori, 4–6 poll. longi. Valvæ spathæ 2, lanceolatæ, erectæ, 8–9 lin. longæ, basi connatæ. Pedicelli 6–9 lin. longi. Perianthium 10–12 lin. longum, pallide lilacinum, segmentis lanceolatis acuminatis erectis carina suturatiore tubo anguste infundibuliformi duplo longioribus. Stamina in tubo biseriata, filamentis filiformibus 3-4 lin. longis. Ovarium sessile, stylo 3 lin. longo. *Patagonia,* Capt. Middleton!

Habitu *M. unifloræ*; differt foliis filiformibus, segmentis lanceolatis acuminatis.

8. M. UNIFLORA, *Graham, Edin. Phil. Journ. Dec.* 1832; *Hook. Bot. Mag.* t. 3327.—Triteleia uniflora, *Lindl. Bot. Reg.* 1293, t. 1921; *Kunth, Enum.* iv. 466; *Flore Jard.* iii. 177.—Milla bonariensis, *Gillies, MSS.* Bulbus ovoideus, proliferus, membranaceo-tunicatus, 6–9 lin. crassus, fibris carnosis, membranis externis sursum longe productis. Folia 6–9, synanthia, carnoso-herbacea, 6–12 poll. longa, 1½–3 lin. lata, glauca. Scapi uni- vel in hortis rarissime biflori. Valvæ spathæ 2, lanceolatæ, 9–15 lin. longæ, deorsum connatæ. Pedicelli 1–2 poll. longi. Perianthium 9–18 lin. longum, pallide lilacinum, segmentis lanceolato-spathulatis flore expanso subpatentibus carina saturatiore tubo infundibuliformi ore 2–2½ lin. crasso paullulum longioribus. Stamina in tubo biseriata, filamentis filiformibus antheris paulo longioribus, superiora ad faucem attingentia. Ovarium sessile, stylo filiformi 3–4 lin. longo. *Bonaria,* Gillies! Tweedie!

Var. *β.* CONSPICUA, *Baker.*—Triteleia conspicua, *Baker, in Saund. Ref. Bot.* t. 43. Segmenta oblongo-spathulata, sursum minus angustata, flore expanso late imbricata. Pedicelli sæpe longiores. *Montevideo,* Tweedie, 1389! Gibert, 507!

Var. *γ.* TWEEDIEANA, *Baker.* Multo minor; folia vix ultra ½ lin. lata;

scapus 2–3 poll. longus; pedicelli 3 lin. longi, e spatho haud exserti; perianthium 5–6 lin. longum, segmentis oblongo-spathulatis tubo æquantibus; stamina omnia e tubo distincte exserta. *Bonaria*, Tweedie! Verisimiliter species vera.

9. M. SELLOWIANA, *Baker*.—Triteleia Sellowiana, *Kunth, Enum.* iv. 466. Bulbus globosus vel ovoideus, membranaceo-tunicatus, 4–6 lin. crassus, membranis externis breviter sursum productis. Folia 6–12, synanthia, firma, modice durantia, 2–4 poll. longa, ½–1 lin. lata. Scapi 1–3, 1–4 poll. longi. Flores semper solitarii, pedicellis 2–3 lin. longis. Valvæ spathæ 2, lanceolatæ, 4-6 lin. longæ, basi connatæ. Perianthium 9–10 lin. longum, flavum, segmentis oblongo-spathulatis purpureo-carinatis 3–4 lin. latis tubo late infundibuliformi duplo longioribus. Stamina leviter biseriata, prope faucem tubi inserta, filamentis filiformibus deorsum applanatis 2–2½ lin. longis. Ovarium sessile, stylo 3 lin. longo. *Brasilia meridionalis et Montevideo*, Sello, 3664! Gibert, 512!

10. M. NIVALIS, *Baker*.—Tristagma nivalis, *Pöppig, Nov. Gen.* ii. 28, t. 140; *C. Gay, Fl. Chil.* vi. 125. Bulbus ovoideus, membranaceo-tunicatus, membranis externis longe sursum productis. Folia 5–6, viridia, carnoso-herbacea, synanthia, 6–9 poll. longa, 1½ lin. lata. Scapi foliis subæquantes. Valvæ spathæ 2, lanceolatæ, 1 poll. longæ, basi connatæ. Umbellæ 2–3-floræ, pedicellis 3–15 lin. longis. Perianthium infundibuliforme, 9–10 lin. longum, segmentis linearibus viridibus carnosis acutis flore expanso patentibus tubo cylindrico ore vix ultra 1 lin. lato duplo brevioribus. Antheræ in tubo distincte biseriatæ, sessiles. Ovarium sessile, lanceolatum, stylo filiformi 1½ lin. longo. *Chili*, Germain!

11. M. PÖPPIGIANA, *Baker*.—Triteleia Pöppigiana, *C. Gay, Fl. Chil.* vi. 117.—T. uniflora, *Flore des Serres*, ix. t. 283? Bulbum non vidi. Folia 6–8, synanthia, carnoso-herbacea, subplana, 8–12 poll. longa, 2½–3 lin. lata. Scapi 2–3, flaccidi, foliis subæquantes. Valvæ spathæ 2 (raro 3–4) lanceolatæ, 1 poll. longæ, basi connatæ. Umbellæ 4–8-floræ, pedicellis apice haud articulatis 12–15 lin. longis. Perianthium infundibuliforme, pallide lilacinum, 9–10 lin. longum, segmentis oblongo-spathulatis tubo infundibuliformi ore 2 lin. crasso paullulum longioribus. Stamina in tubo biseriata, filamentis filiformibus 2 lin. longis, superiora ad faucem attingentia. Ovarium sessile, stylo filiformi 2 lin. longo. *Chili*, C. Gay!

12. M. IXIOIDES, *Baker*.—Ornithogalum ixioides, *Ait. Hort. Kew.* edit. alt. ii. 257.—Themis ixioides, *Salisb. Gen.* 85.—Calliprora lutea, *Lindl. Bot. Reg.* t. 1590; *Hook. et Arn. Bot. Beech.* 400; *Hook. Bot. Mag.* t. 3588. Bulbus globosus, fibroso-tunicatus, 6–8 lin. crassus. Folia 2–3, synanthia, carnoso-herbacea, basin scapi

cingentia, 6–12 poll. longa, 2–6 lin. lata. Scapi erecti, fistulosi, 6–18 lin. longi. Valvæ spathæ 3–4, lineares, 4–6 lin. longæ. Umbellæ 10–20-floræ, pedicellis apice articulatis 1–2 poll. longis. Perianthium infundibuliforme, flavum, 7–12 lin. longum, segmentis lanceolato-spathulatis distincte viridi vittatis subacutis tubo turbinato duplo longioribus. Stamina e fauce tubi leviter biseriata, filamentis complanatis apice tricuspidatis 2–2½ lin. longis. Ovarium longe stipitatum, stylo filiformi 1½ lin. longo. Semina in loculo 5–6. *California*, Douglas! Hartweg, 1996! Jeffray, 1124! Coulter, 741! Bridges, 294! &c.

13. M. LAXA, *Baker.*—Triteleia laxa, *Benth. Trans. Hort. Soc.* i. 413, t. 15. fig. 2; *Lindl. Bot. Reg.* t. 1685; *Hook. et Arn. Bot. Beech.* 401.—Seubertia laxa, *Kunth, Enum.* iv. 475; *Wood, Proc. Phil. Acad.* 1868, 172. Bulbus globosus, 6–9 lin. crassus, fibroso-tunicatus. Folia synanthia, carnoso-herbacea, subplana, 12–18 poll. longa, 2–4 lin. lata. Scapi fragiles, erecti, 12–18 poll. longi. Valvæ spathæ multæ, lanceolatæ et lineares, 6–9 lin. longæ. Umbellæ 8–20-floræ, pedicellis apice articulatis 1–3 poll. longis. Perianthium infundibuliforme, saturate cæruleum, 15–18 lin. longum, segmentis lanceolatis acutis erecto-patentibus tubo infundibuliformi ore 3–4 lin. crasso distincte brevioribus. Stamina in dimidio superiore tubi biseriatim inserta, antheris linearibus filamenta excedentibus. Ovarium stipite 6–9 lin. longo, loculis 12–15-ovulatis, stylo filiformi 1½ lin. longo. *California*, Douglas! Hartweg, 1998! Bigelow! Bridges, 273! &c.

14. M. PEDUNCULARIS, *Baker.*—Triteleia peduncularis, *Lindl. Bot. Reg.* 1865; *Hook. et Arn. Bot. Beech.* 401; *Kunth, Enum.* iv. 469. Bulbum non vidi. Folia synanthia, carnoso-herbacea, 12–18 poll. longa, 3–4 lin. lata. Scapi 1½–2 pedes longi, erecti, fragiles. Valvæ spathæ multæ, lineares, 6–8 lin. longæ, basi liberæ. Umbellæ 12–20-floræ, pedicellis apice articulatis 2–3 poll. longis. Perianthium infundibuliforme, cæruleum, 8–9 lin. longum, segmentis erecto-patentibus lanceolato-spathulatis acutis carina saturatiore tubo infundibuliformi ore 2 lin. crasso paullulum longioribus. Antheræ sessiles, 1½ lin. longæ, in dimidio superiore tubi biseriatim insertæ. Ovarium longe stipitatum, stipite 2–2½ lin. longo, stylo filiformi 1½ lin. longo. Semina in loculo 3–4. *California*, Douglas! Fremont!

15. M. CROCEA, *Baker.*—Seubertia crocea, *Wood, Proc. Acad. Phil.* 1868, 172.—Folia linearia, scapo pedali breviora. Valvæ spathæ 4, acuminatæ, pedicellis breviores. Umbellæ 5–6-floræ. Perianthium infundibuliforme, croceum, 9 lin. longum, segmentis obtusis. Antheræ oblongæ, biseriatæ. Ovarium longe stipitatum. Semina in loculo 5. *California*, Prof. Wood (*non vidi*).

16. M. HYACINTHINA, *Baker.*—Hesperoscordium hyacinthinum, *Lindl. Bot. Reg. sub* t. 1293; *Kunth, Enum.* iv. 464.—H. Lewisii, *Hook. Flo. Bor. Am.* ii. 185.—Brodiæa grandiflora, *Nuttall, non Smith.* Bulbus globosus, 6–12 lin. crassus, fibroso-tunicatus. Folia 2–3, synanthia, carnoso-herbacea, 12–18 poll. longa, 3–6 lin. lata. Scapi firmi, erecti, 1–2 pedes longi. Valvæ spathæ multæ, lineares, 5–6 lin. longæ. Umbellæ 10–30-floræ, pedicellis 6–12 lin. longis apice articulatis. Perianthium infundibuliforme, album, 6–7 lin. longum, segmentis lanceolato-spathulatis viridi-vittatis erecto-patentibus tubo campanulato triplo longioribus. Stamina e fauce subuniseriata, filamentis deltoideis petaloideis vix 1 lin. longis. Ovarium distincte stipitatum, stylo 1 lin. longo. Semina in loculo 2–3. *Insulæ Vancouver et St. Juan*, Lyall! *Columbia britannica,* Douglas! Hinds! *&c. Oregon,* Nuttall! *California,* Bridges!

Var. β. LACTEUM, *Baker.*—H. lacteum, *Lindl. Bot. Reg.* t. 1639; *Kunth, Enum.* iv, 464; *Wood, Proc. Acad. Phil.* 1868, 171. Gracilior, floribus paucioribus, pedicellis elongatis (1–3 poll. longis). *California,* Douglas! Hartweg 1994!

17. M. SETACEA, *Baker.* Bulbus ovoideus, 3–4 lin. crassus, membranaceo-tunicatus, membranis externis sursum longe productis. Folia 5–6, synanthia, 3–4 poll. longa, setacea, modice firma. Scapus filiformis, glaber, 2–3 poll. longus, semper uniflorus. Valvæ spathæ 2, lineares, 3–4 lin. longæ, basi connatæ. Pedicelli 1½–2 lin. longi. Perianthium infundibuliforme, albidum, 4½–5 lin. longum, tenerum, segmentis oblongo-spathulatis subacutis carina pallide brunnea tubum campanulatum 3–4-plo excedentibus. Stamina ad faucem tubi inserta, leviter biseriata, filamentis filiformibus 1½–2 lin. longis. Ovarium sessile, stylo filiformi 2 lin. longo. *Tucuman,* Tweedie!

18. M. HIRTELLA, *Baker.*—Triteleia hirtella, *Kunth, Enum.* iv. 465. Bulbus subgloboso-ovoideus. Folia 4–6, synanthia, 3 poll. longa, filiformia, vix ¼ lin. lata. Scapus 3–3½ poll. longus, hirtellus, unirus. Valvæ spathæ pedicellum brevem longe superantes. Perianthium luteum, parum minor quam in *M. Sellowiano,* segmentis ellipticis acutis tubo campanulato triplo longioribus. Stamina prope faucem tubi inserta, filamentis late subulatis. Ovarium sessile, stylo filiformi ovario longiore. *Montevideo,* Gaudichaud (*non vidi*).

19. M. SUBBIFLORA, *Baker.*—Allium subbiflorum, *Colla, Act. Taur.* 39, p. 13, t. 52.—Triteleia Berteri, *Kunth, Enum.* iv. 467; *C. Gay, Fl. Chil.* vi. 116. Bulbus ovoideus, 4–6 lin. crassus, membranaceo-tunicatus, membranis externis productis. Folia 4–6, modice firma, synanthia, 3–5 poll. longa, ½ lin. lata. Scapi 1½–3 poll. longi, uni- vel sæpe biflori. Valvæ spathæ 2, lanceolatæ, 4–5 lin. longæ, basi con-

natæ. Pedicelli 1–2 lin. longi. Perianthium infundibuliforme, albidum, 5–6 lin. longum, segmentis oblongo-spathulatis subacutis distincte brunneo-carinatis tubum companulatum 3–4-plo excedentibus. Stamina e fauce tubi leviter biseriata, filamentis filiformibus 1½ lin. longis. Ovarium sessile, stylo 1 lin. longo. *Chili*, Bertero! Bridges 342!

20. M. BREVIPES, *Baker*.—Triteleia brevipes, *Kunze, Linnæa*, xx. 9. Folia 4–8, 3 poll. longa, 1¼ lin. lata. Scapus foliis paullulum brevior. Valvæ spathæ 2, basi connatæ, parte libera 6 lin. longa. Umbellæ 3-floræ, pedicellis vix 1 lin. longis. Perianthium album, 5–6 lin. longum, segmentis lanceolatis brunneo-carinatis tubo quadruplo longioribus. Stamina biseriata, filamentis filiformibus deorsum complanatis. Ovarium sessile. *Chili* (*non vidi*).

21. M. BIVALVIS, *Baker*.—Triteleia bivalvis, *Lindl. Bot. Reg. sub* t. 1293; *Kunth, Enum*. iv. 468; *C. Gay, Fl. Chil*. vi. 117.—T. Gaudichaudiana et violacea, *Kunth, loc. cit.* Bulbus ovoideus, 6–9 lin. crassus, membranaceo-tunicatus. Folia 4–6, synanthia, carnoso-herbacea, 6–9 poll. longa, 1–2 lin. lata. Scapus tener, foliis subæquans. Valvæ spathæ 2, lineari-lanceolatæ, basi connatæ, 6–9 lin. longæ. Umbellæ 2–4-floræ, pedicellis flaccidis 6–12 lin. longis. Perianthium infundibuliforme, album vel albido-violaceum, 6–7 lin. longum, segmentis oblongo-spathulatis distincte brunneo-carinatis tubum campanulatum quadruplo excedentibus. Stamina e tubo biseriata, filamentis deorsum complanatis 1½ lin. longis. Ovarium sessile, stylo filiformi 1–1½ lin. longo. Semina in loculo 5–6. *Chili*, Beechey! Cuming, 651! Bridges! *&c.*

22. M. PORRIFOLIA, *Baker*.—Triteleia porrifolia, *Pöpp. Fragm.* 10; *Kunth, Enum*. iv. 468; *Pöpp. et Endl. Nov. Gen*. t. 139; *C. Gay, Fl. Chil*. vi. 118. Bulbus ovoideus, 8–12 lin. crassus, membranaceo-tunicatus. Folia 4–5, synanthia, carnoso-herbacea, 6–8 poll. longa, 1–2 lin. lata. Scapus foliis subæquans. Valvæ spathæ 2, lanceolatæ vel lineares, basi connatæ, 8–12 lin. longæ. Umbellæ 4–6-floræ, pedicellis 6–9 lin. longis. Perianthium infundibuliforme, albido-violaceum, 9–10 lin. longum, segmentis lanceolato-spathulatis tubo subtriplo longioribus. Stamina e tubo biseriata, filamentis 2½–3 lin. longis. Ovarium sessile, stylo filiformi 4 lin. longo. *Chili*, Philippi! Germain! Beechey!

23. M. AUREA, *Baker*.—Triteleia aurea, *Lindl. Bot. Reg*. 1841, p. 78; *Kunth, Enum*. iv. 469; *Baker in Saund. Ref. Bot*. t. 42. Bulbus globosus, 4–6 lin. crassus, membranis albidis tunicatus. Folia 6–8, carnoso-herbacea, synanthia, filiformia, 3–4 poll. longa, ½ lin. lata. Scapi 1–3, erecti, 2–4 poll. longi. Valvæ spathæ 2, lanceolatæ, basi connatæ, 4–6 lin. longæ. Umbellæ 2–6-floræ, pedicellis 6–18

lin. longis. Perianthium croceum, 5–6 lin. longum, segmentis oblongo-spathulatis subobtusis viridi-vittatis flore expanso subpatentibus tubo brevi 3–4-plo longioribus. Stamina e fauce tubi leviter biseriata, filamentis filiformibus 1½–2 lin. longis. Ovarium sessile, stylo 1½ lin. longo. Semina in loculo 5–6. *Bonaria*, Gillies! *Montevideo*, Gibert! Isabelle! *Entre Rios*, Tweedie!

13. MASSONIA, *Linn.*

Linn. Gen. 1381; *Endl. Gen.* 1126; *Kunth, Enum.* iv. 295; *Salisb. Gen.* 17; *Harv. Cap. Gen.* 2nd edit. 395.—Polyxena, *Kunth, Enum.* iv. 294; *Harv. loc. cit.*—Podocallis, *Salisb. Gen.* 17.—Mauhlia, *Thunb. Nov. Gen.* iii. *Prodr.* 60, t. 1 (*ex parte*); *Salisb. Gen.* 17 (*sphalmate* Manlilia).

Perianthium tubuloso-gamophyllum, segmentis linearibus vel lanceolatis æqualibus plerisque reflexis tubo æquantibus vel brevioribus. *Stamina* 6, ad faucem tubi uniseriatim inserta vel raro plus minus distincte biseriata e tubo, filamentis filiformibus basi sæpe in cupulum melliferum connatis; *antheris* oblongis versatilibus. *Ovarium* sessile, oblongo-triquetrum, ovulis in loculis pluribus; *stylus* rectus, filiformis; *stigma* capitatum. *Capsula* membranacea, pro planta magna, sessilis, obovata, loculicide trivalvis, profunde trisulcata, acute angulata, seminibus globosis parvis plerisque pluribus raro paucis vel solitariis. *Testa* nitida nigra. *Herbæ bulbosæ habitu proprio singulari, floribus corymbosis rarissime solitariis pedunculis nullis vel brevibus, foliis semper* 2 *synanthiis plus minus carnosis humistratis.*

§ EUMASSONIA. *Corymbi sessiles vel breviter pedunculati, bracteis exterioribus magnis involucrati. Stamina e fauce uniseriata.*

- Folia facie setosa.
  - Segmenta tubo paulo breviora.
    - Folia carnosa, dense setosa.
      - Folia rotundata, 1½–2 poll. longa .... 1. *hirsuta.*
      - Folia ovata, 3–5 poll. longa .... 2. *echinata.*
    - Folia lanceolata, firma, sparse setulosa .. 3. *setulosa.*
  - Segmenta tubo duplo breviora.
    - Filamenta ½ lin. longa .... 4. *tenella.*
    - Filamenta 5–6 lin. longa .... 5. *muricata.*
- Folia facie pustulata.
  - Folia lanceolato-elliptica............ 6. *pauciflora.*
  - Folia rotundato-ovata .... 7. *pustulata.*

Folia lævia.
Filamenta 1 lin. longa.
Tubus ½ lin. crassus. Pedicelli 2–3 lin. longi.
8. *jasminiflora.*
Tubus 1 lin. crassus. Pedicelli nulli.... 9. *Bowkeri.*
Filamenta 3 lin. longa .... 10. *Huttoni.*
Filamenta 6–9 lin. longa.
Segmenta tubo subæquantia.
Filamenta saturate rubra.
Folia subrotundata. Scapus subnullus.
11. *latifolia.*
Folia anguste obovata. Scapus 1½–2 poll. longus.
12. *lanceæfolia.*
Filamenta viridi-flavescentia .... 13. *obovata.*
Segmenta tubo duplo breviora.
Folia oblongo-oblanceolata .... 14. *longifolia.*
Folia subrotundata.
Filamenta saturate rubra.......... 15. *sanguinea.*
Filamenta flavescenti-rubra........ 16. *cordata.*
Filamenta alba .... 17. *candida.*

§ ASTEMMA (Endlich.). *Corymbus breviter pedunculatus exinvolucratus. Stamina e fauce tubi uniseriata.*

Stamina segmentis limbi subæquantia.
Tubus cylindricus, 5–6 lin. longus .... 18. *angustifolia.*
Tubus filiformis, 15–18 lin. longus .... 19. *comata.*
Stamina segmentis limbi duplo longiora.
Segmenta patentia .... 20. *marginata.*
Segmenta erecta.
Bracteæ minutæ, deltoideæ .... 21. *Zeyheri.*
Bracteæ lanceolatæ, 3–4 lin. longæ...... 22. *Burchellii.*

§ POLYXENA (Kunth). *Corymbus vel flos solitarius breviter pedunculatus, exinvolucratus. Stamina plus minus distincte bi seriata.*

Folia graminoidea. Scapus uniflorus ...... 23. *uniflora.*
Folia lata, subcarnosa. Flores corymbosi.
Bracteæ elongatæ. Segmenta tubo paulo breviora.
24. *pygmæa.*
Bracteæ minutæ. Segmenta tubo 4–6-plo breviora.
25. *ensifolia.*

1. **M. HIRSUTA**, *Link et Otto, Abbild.* t. 1; *Roem. et Schult.* vii. 987;

Kunth, Enum. iv. 296.—M. pusilla, *Masson, MSS., Salisb. Gen,* 17. Folia carnosa, rotundata, 1½–2 poll. longa et lata, obtusa, basi cordata, utrinque setis albidis dense vestita. Scapi nulli. Bracteæ pubescentes, ciliatæ, exteriores oblongo-spathulatæ, 5–6 lin. longæ. Corymbi dense 20–30-flori. Pedicelli 2–3 lin. longi. Perianthium albidum, 5–6 lin. longum, segmentis linearibus demum reflexis, tubo ore ½ lin. crasso paulo brevioribus. Filamenta filiformia, segmentis æquantia. *Cap. B. Spei,* Masson! Zeyher, 130! 4273!

2. M. ECHINATA, *Linn. Suppl.* 193; *Thunb. Prodr.* 60, *Fl. Cap.* 308; *Kunth, Enum.* iv. 296. Folia tenuiter carnosa, ovata, 3–5 poll. longa, 1½–2 poll. lata, utrinque setis albidis nitidis 2–2½ lin. longis dense vestita. Scapi subnulli. Bracteæ exteriores lineares 8–9 lin. longæ. Corymbi dense 20–30-flori. Pedicelli exteriores 6–9 lin. longi. Perianthium albidum, 7–8 lin. longum, segmentis linearibus reflexis tubo ore ½ lin. crasso paulo brevioribus. Stamina filiformia, 4–5 lin. longa. Capsula sessilis, oblonga, 4½ lin. longa. *Cap. B. Spei,* Masson! Zeyher, 1717! &c.

3. M. SETULOSA, *Baker.* Folia coriaceo-carnosa, lanceolata, acuta, ascendentia, 12–15 lin. longa, 4½–5 lin. lata, basi sensim angustata, supra setis albidis brevibus sparse vestita. Scapi nulli. Bracteæ exteriores oblongo-rotundatæ, acutæ, 5–6 lin. longæ. Corymbi 10–12-flori. Pedicelli exteriores 2–3 lin. longi. Perianthium albidum, 5–6 lin. longum, segmentis lanceolatis reflexis tubo gracili paulo brevioribus. Filamenta albida, 3–4 lin. longa. *Cap. B. Spei,* Ecklon et Zeyher!

4. M. TENELLA, *Soland. MSS. in Herb. Mus. Brit.* Folia crasse carnoso-coriacea, lanceolata, acuta, 1 poll. longa, utrinque angustata, petiolata, petiolis scapum arcte cingentibus, supra setis robustis albidis dense vestita. Scapi 12–15 lin. longi. Bracteæ exteriores oblongo-spathulatæ, 5–6 lin. longæ. Corymbi pauciflori. Perianthium 4–4½ lin. longum, segmentis lineari-lanceolatis erectis tubo gracili duplo brevioribus. Filamenta lanceolata, vix ultra ½ lin. longa. *Cap. B. Spei,* Masson! Drège, 3509!

5. M. MURICATA, *Gawl. Bot. Mag.* t. 559; *Ait. Hort. Kew.* edit. 2, ii. 210; *Kunth, Enum.* iv. 296. Folia carnoso-herbacea, rotundato-cordata, 3–4 poll. longa et lata, extrorsum supra dense setosa. Scapi subnulli. Bracteæ exteriores oblongo-lanceolatæ, 1 poll. longæ. Pedicelli exteriores 5–6 lin. longi. Perianthium albidum, 1 poll. longum, segmentis lanceolatis reflexis tubo subduplo brevioribus. Filamenta albida, tubo subæquantia, basi connata. *Cap. B. Spei.*

6. M. PAUCIFLORA, *Dryand. in Ait. Hort. Kew.* edit. 2, ii. 210; *Roem. et Schult.* vii. 987; *Kunth, Enum.* iv. 296. Folia lanceolata

vel elliptica, tuberculata, tuberculis nudis. Segmenta limbi ovata. *Cap. B. Spei* (*non vidi*).

7. M. PUSTULATA, *Jacq. Coll.* iv. 177; *Hort. Schoen.* t. 454; *Redouté, Lil.* t. 183; *Bot. Mag.* t. 642; *Kunth, Enum.* iv. 296. Folia carnoso-herbacea, rotundato-ovata, 5–6 poll. longa, 3–4 poll. lata, subacuta, basi angustata, facie pustulata. Scapi semiunciales. Bracteæ exteriores ovato-lanceolatæ, 1 poll. longæ. Pedicelli exteriores 3–4 lin. longæ. Corymbi 10–20-flori. Perianthium 1 poll. longum, segmentis lineari-lanceolatis reflexis tubo duplo brevioribus. Filamenta alba, 6–7 lin. longa, basi connata. *Cap. B. Spei.*

8. M. JASMINIFLORA, *Burchell, MSS.*—Podocallis nivea, *Salisb. Gen.* 17?. Folia oblongo-rotundata, carnoso-herbacea, lævia, subacuta, 2 poll. longa, 12–16 lin. lata, basi spathulatim angustata. Scapi nulli. Bracteæ exteriores ovatæ, acutæ, 3–4 lin. longæ. Pedicelli exteriores 2–3 lin. longi. Corymbus 10–12-florus. Perianthium albidum, 6 lin. longum, segmentis lanceolatis reflexis tubo ½ lin. crasso duplo brevioribus. Filamenta 1 lin. longa, basi distincte connata. *Cap. B. Spei,* Burchell! (*v. s. cult.*).

9. M. BOWKERI, *Baker.* Folia carnoso-herbacea, oblongo-rotundata, lævia, obtusa, 12–15 lin. longa, 9–12 lin. lata. Scapi nulli. Bracteæ exteriores lanceolatæ, acuminatæ, 6–7 lin. longæ. Corymbus 15–20-florus. Pedicelli subnulli. Perianthium albidum, 6 lin. longum, segmentis lanceolatis erectis tubo cylindrico 1 lin. crasso duplo brevioribus. Filamenta 1 lin. longa, carnosa, complanata, basi distincte connata. *Cap. B. Spei* (*Orange River Free State*), Bowker!

10. M. HUTTONI, *Baker.* Folia carnoso-herbacea, lævia, ovato-rotundata, 21–24 lin. longa, 15–16 lin. lata, subobtusa, basi in petiolum brevem cite angustata. Scapi 6–9 lin. longi. Corymbi 15–20-flori. Bracteæ exteriores rotundatæ, acutæ, 7–8 lin. longæ, 6–7 lin. latæ. Pedicelli exteriores 2–3 lin. longi. Perianthium albidum, 6–7 lin. longum, segmentis linearibus reflexis 3 lin. longis. Filamenta filiformia, 3 lin. longa, basi libera. *Cap. B. Spei* (*Albany*) Hutton!

11. M. LATIFOLIA, *Linn. Suppl.* 195; *Thunb. Fl. Cap.* 307; *Jacq. Schoen.* iv. 28, t. 455; *Kunth, Enum.* iv. 296. Folia carnoso-herbacea, lævia, ovato-subrotundata, demum 8–10 poll. longa, 6–8 poll. lata, lineata, interdum purpureo-maculata. Scapus nullus vel brevissimus. Bracteæ ovato-lanceolatæ, exteriores 12–18 lin. longæ. Corymbi dense 20–30-flori. Pedicelli exteriores 5–6 lin. longi. Perianthium album, segmentis lineari-lanceolatis reflexis tubo subæquantibus. Filamenta saturate rubra, basi connata, 8–9 lin. longa. Capsula obovoidea, 1. poll. longa. *Cap. B. Spei;* Masson! Burchell! Drège, 2683 *c*! Ecklon et Zeyher!

12. M. LANCEÆFOLIA, *Jacq. Hort. Schoen.* iv. 29, t. 436; *Roem. et Schult.* vii. 991; *Kunth, Enum.* iv. 297. Folia carnoso-herbacea, lævia, anguste obovata, 8–10 poll. longa, 4–5 poll. lata, lineata, basi sensim angustata, scapum cingentia. Scapus $1\frac{1}{2}$–2 poll. longus. Bracteæ exteriores ovato-lanceolatæ, 12–15 lin. longæ. Corymbi 15–20-flori. Pedicelli exteriores 5–6 lin. longi. Perianthium album, segmentis lineari-lanceolatis reflexis tubo subæquantibus. Filamenta saturate rubra, 7–8 lin. longa, basi connata. *Cap. B. Spei.*

13. M. OBOVATA, *Jacq. Hort. Schoen.* iv. 29, t. 458; *Roem. et Schult. Syst.* vii. 991; *Kunth, Enum.* iv. 297.—M. grandiflora, *Lindl. Bot. Reg.* t. 958. Folia carnoso-herbacea, lævia, obovata, subacuta, 6–7 poll. longa, 3–4 lin. lata, sublineata. Scapus brevis. Bracteæ exteriores lanceolatæ, 1 poll. longæ. Pedicelli exteriores 5–6 lin. longi. Perianthium album, 1 poll. longum, segmentis lineari-lanceolatis reflexis tubo subæquantibus. Corymbi 10–12-flori. Filamenta viridi-flavescentia, 6 lin. longa, basi connata. *Cap. B. Spei.*

13*. M. NERVOSA, *Hornem. Hafn. Suppl.* 39; *Kunth, Enum.* iv. 298. Folia ovato-lanceolata, acuta, 15-nervata, lævia. Tubus pallide violaceus. Segmenta pallide straminea, tubo æquantia, erecta. Stamina straminea, segmentis duplo longiora. *Cap. B. Spei* (*non vidi*).

14. M. LONGIFOLIA, *Jacq. Hort. Schoen.* iv. 29, t. 457; *Roem. et Schult. Syst.* vii. 990; *Kunth, Enum.* iv. 297. Folia carnoso-herbacea, oblongo-oblanceolata, 10–12 poll. longa, 4 poll. lata, subacuta, lævia, basi angustata, scapum cingentia. Scapus uncialis. Bracteæ exteriores ovato-lanceolatæ, 1 poll. longæ. Pedicelli exteriores 9–12 lin. longi. Corymbi 20–30-flori. Perianthium album, 1 poll. longum, segmentis lineari-lanceolatis tubo 3 lin. crasso subduplo brevioribus. Filamenta albida, 8–9 lin. longa, basi connata. *Cap. B. Spei.*

15. M. SANGUINEA, *Jacq. Hort. Schoen.* iv. 31, t. 461; *Roem. et Schult.* vii. 989; *Kunth, Enum.* iv. 297.—M. latifolia, *Bot. Mag.* t. 848, *non L.* Folia carnoso-herbacea, subrotundato-cordata acuta, 4–6 poll. longa, 3–4 poll. lata, lineata. Scapus brevis. Bracteæ exteriores ovato-lanceolatæ, circiter 1 poll. longæ. Pedicelli exteriores 5–6 lin. longi. Corymbi 15–20-flori. Perianthium album, 9–10 lin. longum, segmentis lineari-lanceolatis tubo ore 3 lin. crasso duplo brevioribus. Filamenta saturate rubra, 6 lin. longa, basi connata. *Cap. B. Spei.*

Var. *β*. CORONATA, *Baker.*—M. coronata, *Jacq. Schoen.* iv. 30, t. 460; *Kunth, Enum.* iv. 297. Folia paulo minora, obtusiora, minus lineato-nervosa. Flores pauciores. *Cap. B. Spei.*

16. M. CORDATA, *Jacq. Hort. Schoen.* iv. 36, t. 459; *Roem. et Schult.*

Syst. 989; *Kunth, Enum.* iv. 297. Folia carnosa-herbacea, lævia, sublineata, subrotundata, acuta, 6–7 poll. longa, $4\frac{1}{2}$–5 poll. lata. Scapus subnullus. Corymbi dense 20–30-flori. Bracteæ exteriores lanceolatæ, circiter 1 poll. longæ. Pedicelli exteriores 5–6 lin. longi. Perianthium album, 9–10 lin. longum, laciniis linearibus tubo ore 2–$2\frac{1}{2}$ lin. crasso duplo brevioribus. Filamenta flavescenti-rubra, 6 lin. longa, basi connata. *Cap. B. Spei.*

17. M. CANDIDA, *Burchell in Bot. Reg.* t. 694. Folia carnoso-herbacea, rotundata, lævia, obtusa, lineata, 3–5 poll. longa et lata, basi cordata vel late rotundata. Scapi nulli. Bracteæ exteriores ovato-lanceolatæ, 1 poll. longæ. Pedicelli exteriores 5–6 lin. longi. Corymbi 20–30-flori. Perianthium album, 9–10 lin. longum, segmentis lineari-lanceolatis reflexis tubo duplo brevioribus. Filamenta albida, 5–6 lin. longa. *Cap. B. Spei,* Burchell!

18. M. ANGUSTIFOLIA, *Linn. Suppl.* 193; *Ait. Kew.* i. 105, t. 4; *Bot. Mag.* t. 736; *Kunth, Enum.* iv. 298.—M. lanceolata, *Thunb. Fl. Cap.* 308. Folia lanceolata, ascendentia, acuta, 3–4 poll. longa, circiter 1 poll. lata. Corymbus breviter pedunculatus, 6–20-florus. Bracteæ lineari-lanceolatæ, 6–7 lin. longæ. Pedicelli inferiores 4–6 lin. longæ. Perianthium albidum, 8–9 lin. longum, segmentis linearibus reflexis tubo duplo brevioribus. Stamina filiformia, segmentis æquantia, rubra, e fauce uniseriata, basi connata. *Cap. B. Spei* (*v. s. cult. in Herb. Mus. Brit.*).

19. M. COMATA, *Burchell, MSS.* Folia carnoso-herbacea, lorato-lanceolata, in exemplis originalibus 3–4 poll. in cultis 9–12 poll. longa, 12–15 lin. lata, haud petiolata, basi scapum arcte cingentia. Scapus $\frac{1}{2}$–1 poll. longus, foliis omnino occultus. Corymbus 20–30-florus. Pedicelli brevissimi. Bracteæ lineares, 6–9 lin. longæ. Perianthium album, 15–21 lin. longum, tubo filiformi interdum 18 lin. longo, segmentis linearibus reflexis 3 lin. longis. Filamenta e fauce uniseriata, libera, segmentis subæquantia. *Cap. B. Spei,* Burchell, 2751!

20. M. MARGINATA, *Willd. Herb.*; *Kunth, Enum.* iv. 299. Folia oblonga, carnoso-coriacea, margine undulata, glabra, scapo vix longiora. Scapus brevis. Bracteæ lanceolatæ, tubo breviores. Perianthium albidum, segmentis lanceolatis acutis patentibus tubo paulo brevioribus. Filamenta rosea, segmentis duplo longiora, libera. *Cap. B. Spei* (*non vidi*).—M. rugulosa, *Lichst.*; *Kunth, loc. cit.*, e descriptione non potui distinguere.

21. M. ZEYHERI, *Kunth, Enum.* iv. 298.—M. angustifolia, *Redouté, Lil.* t. 392? Folia carnoso-herbacea, lanceolata, 3–4 poll. longa, 1 poll. lata, basi in petiolum scapum cingentia sensim angustata. Scapus 2 poll. longus. Corymbus 12–20-florus. Bracteæ parvæ,

deltoideæ. Pedicelli inferiores 3–4 lin. longi. Perianthium album, 1 poll. longum, segmentis linearibus erectis tubo duplo brevioribus. Filamenta filiformia, 8–9 lin. longa, purpurea, basi connata. *Cap. B. Spei*, Zeyher!

22. M. BURCHELLII, *Baker.* Folia carnoso-herbacea, lævia, lanceolata, 5–6 poll. longa, 1½–2 poll. lata, lævia, basi in petiolum brevem sensim angustata. Scapus subpollicaris. Corymbus dense 10–12-florus. Pedicelli brevissimi. Bracteæ lanceolatæ, 3–4 longæ. Perianthium albidum, 10–12 lin. longum, segmentis lineari-ligulatis obtusis erectis tubo gracili duplo brevioribus. Stamina saturate rubra, 8–9 lin. longa, basi connata. *Cap. B. Spei*, Burchell!

23. M. UNIFLORA, *Soland. MSS.; Bot. Reg. sub t.* 694 (*nomen solum*). Folia graminoidea, erecta, 3½–4 poll. longa, vix 1 lin. lata. Scapus pollicaris, uniflorus. Perianthium pallide lilacinum, tubo pergracili 15 lin. longo, segmentis lanceolatis reflexis tubo quadruplo brevioribus. Stamina filiformia, valde biseriata, inferiora ad medium, superiora ad faucem tubi inserta, filamentis segmentis subduplo brevioribus. *Cap. B. Spei* (*v. s. in Herb. Mus. Brit.*).

24. M. PYGMÆA, *Schlecht. MSS.*; *Kunth, Enum.* iv. 298. Folia coriaceo-carnosa, glabra, elliptica, obtusiuscula, basi angustata, corymbum paulo superantia. Scapus brevis. Bracteæ lineares, apice spathulato-dilatatæ, floribus æquantes. Pedicelli floribus subæquantes. Perianthium tubo elongato gracili segmentis linearibus tubo paulo brevioribus. Stamina inæqualia, superiora segmenta paulo superantia. *Cap. B. Spei* (*Mundt et Maire*).

25. M. ENSIFOLIA, *Gawl. Bot. Mag.* t. 554; *Ait. Kew.* edit. 2, ii. 211.—Mauhlia ensifolia, *Thunb. Fl. Cap.* 308.—Polyanthes pygmæa, *Jacq. Ic.* ii. 15, t. 380.—Polyxena pygmæa, *Kunth, Enum.* iv. 294.—Massonia violacea, *Andr. Bot. Rep.* t. 46; *Red. Lil.* t. 386. Folia carnoso-herbacea, lanceolata, 2–4 poll. longa, 12–18 lin. lata, basi scapum arcte cingentia. Scapus ½–1 poll. longus, occultus. Corymbus 3–12-florus. Pedicelli inferiores 6–9 lin. longi. Bracteæ minutæ. deltoideæ. Perianthium lilacinum, 9–12 lin. longum, segmentis lineari-ligulatis patentibus tubo gracili 4–6-plo brevioribus. Stamina leviter biseriata, segmentis subæquantia. *Cap. B. Spei*, Drège! Zeyher, 757! &c.

14. BRACHYSCYPHA, *Baker*.

Massoniæ sp., *Thunb.*—Lachenalia, sp. *Jacq.*

Perianthium campanulato-gamophyllum, segmentis ligulatis erectis tubo multoties longioribus, 3 exterioribus paulo brevioribus apice galeatis. *Stamina* 6, ad faucem tubi uniseriatim inserta, filamentis filiformibus exsertis, antheris oblongis versatilibus. *Ovarium* sessile, oblongo-triquetrum, ovulis in loculis 6–8; *stylus* rectus, filiformis; *stigma* capitatum. *Capsula* membranacea, sessilis, obovato-triquetra, loculicide trivalvis, seminibus in loculis paucis. *Semina* matura non vidi. *Herba bulbosa foliis pluribus lanceolatis coriaceis, floribus corymbosis pedunculis brevibus. Inter* Massoniam *et* Lachenaliam *habitu medium tenens.*

1. B. UNDULATA, *Baker.*—Massonia undulata, *Thunb. Prodr.* 60; *Fl. Cap.* 308; *Willd. Sp. Plant.* ii. 28; *Kunth, Enum.* iv. 300.—Lachenalia pusilla, *Jacq. Ic.* t. 385; *Kunth, Enum.* iv. 292. Folia 4–5, lanceolata, 12–18 lin. longa, glabra, undulata, basi in petiolos scapum cingentia sensim angustata. Scapus 6–18 lin. longus. Corymbus 6–12-florus. Bracteæ et pedicelli infimi 1½ lin. longi. Perianthium lilacinum, membranaceum, 3½–4 lin. longum. *Cap. B. Spei,* Jacquin, cult.! Drège, 2687! Ecklon et Zeyher, Asphod. 23!

15. DAUBENYA, *Lindl.*

Lindl. Bot. Reg. t. 1813; *Endl. Gen.* 1127; *Kunth, Enum.* iv. 300; *Harv. Cape Genera,* 2nd edit. 395.

Perianthium tubuloso-gamophyllum, limbo in floribus omnibus vel precipue exterioribus bilabiato, segmentis labii superioris linearibus multo minoribus, labii inferioris majoribus oblongo-spathulatis. *Stamina* 6, ad basin segmentorum inserta, uniseriata vel biseriata, filamentis filiformibus antheris oblongis versatilibus. *Ovarium* sessile, oblongo-triquetrum, ovulis in loculis pluribus; *stylus* rectus, filiformis; *stigma* capitatum. *Capsulam* non vidi. *Herbæ bulbosæ foliis et habitu* Massoniæ *sed floribus irregularibus speciosioribus.*

Flores aurei, exteriores 15 lin. longi .... 1. *aurea.*
Flores rubri, exteriores 2–3 poll. longi
  Scapus perspicuus; segmenta majora 1½–2 lin. lata. 2. *fulva.*
  Scapus nullus; segmenta majora 5–6 lin. lata .. 3. *coccinea.*

1. D. AUREA, *Lindl. Bot. Reg.* t. 1813; *Kunth, Enum.* iv. 301. Folia carnoso-herbacea, oblongo-lanceolata, 4 poll. longa. Scapus brevissimus. Corymbus dense multiflorus, floribus flavis subsessilibus. Flores exteriores ultra 1 poll. longi, segmentis labii inferioris oblongo-spathulatis tubum excedentibus, filamentis 3–4 lin. longis. Flores centrales segmentis erectis linearibus irregularibus

tubo multo brevioribus, filamentis basi leviter connatis. *Cap. B. Spei.*

2. D. FULVA, *Lindl. Bot. Reg.* 1839, t. 53; *Kunth, Enum.* iv. 300. Folia carnoso-herbacea, lanceolata, 3–4 poll. longa, basi in petiolos scapum cingentia angustata. Scapus 2–4 poll. longus. Corymbus 20–30-florus, floribus saturate rubris subsessilibus. Bracteæ exteriores oblongo-spathulatæ, 8–9 lin. longæ. Flores exteriores 2–2½ poll. longi, segmentis labii inferioris ligulato-spathulatis 6–9 lin. longis, 1½–2 lin. latis, labii superioris minutis linearibus uniseriatis vel biseriatis, filamentis 1–3 lin. longis. Flores centrales segmentis irregulariter superpositis, suberectis linearibus 1½–2 lin. longis. *Cap. B. Spei? (v. s. cult. in Herb. Saunders).*

3. D. COCCINEA, *Harv. MSS.* Folia carnoso-coriacea, oblongo-spathulata, 4–5 poll. longa, 18–21 lin. lata, valde lineata, margine undulata, haud petiolata. Corymbus subsessilis, dense multiflorus, floribus coccineis subsessilibus. Bracteæ exteriores obovatæ, 1 poll. longæ. Flores exteriores 3 poll. longi, segmentis labii inferioris oblongo-spathulatis 15–18 lin. longis 5–6 lin. latis, labii superioris linearibus minutis, filamentis 1–1½ lin. longis. Flores centrales segmentis linearibus minutis suberectis inæqualibus. *Cap. B. Spei,* Harvey!

16. DIPCADI, *Medic.*

Medic. Act. Palat. vi. 431; *Ust. Ann.* ii. 13; *Mœnch, Meth.* 633; *Webb, Phyt.* iii. 340; *Parl. Fl. Ital.* ii. 481.—Uropetalum, *Burch. MSS.*; *Ker, Bot. Reg.* t. 156; *Endl. Gen.* 1122; *Kunth, Enum.* iv. 377; *Harv. Cap. Gen.* 2nd edit. 398.—Zuccagnia, *Thunb.* non *Cav.*—Polemannia, *Berg.* non *Ecklon.*—Tricharis, *Salisb. Gen.* 24.—Hyacinthi sp., *Linn.* &c.

Perianthium tubulosum, viride vel albido- vel flavo-virescens, tubo cylindrico, segmentis difformibus, interioribus valvatis alte approximatis apice patulis, exterioribus falcatis dorso sub apice gibbosis sæpe longioribus caudatis. *Stamina* ad faucem vel medium tubi uniseriata, æqualia, filamentis nullis vel brevibus filiformibus, antheris linearibus versatilibus. *Ovarium* oblongum, sessile vel stipitatum, ovulis in loculis pluribus; *stylus* brevis, rectus; *stigma* trilobatum. *Capsula* membranacea, rotundata vel late obovata, profunde trisulcata, sessilis vel stipitata, loculicide trivalvis, seminibus in loculis 6–20, complanatis alatis discoideis uniseriatis. *Testa* nigra, nitida. *Herbæ bulbosæ floribus secundo racemosis, foliis sæpissime carnoso-herbaceis anguste linearibus.*

§ TRICHARIS (Salisb.). *Segmenta limbi æquilonga.*

- Ovarium sessile vel subsessile.
  - Folia glabra anguste linearia, deorsum 2–3 lin. lata.
    - Bracteæ pedicellis longiores.
      - Folia 6–12 poll. longa.
        - Perianthium 5–6 lin. longum ...... 1. *serotinum.*
        - Perianthium 7–8 lin. longum ...... 2. *unicolor.*
      - Folia 1½–2-pedalia vel ultra.......... 3. *longifolium.*
    - Bracteæ pedicellis subduplo breviores .. 4. *hydsuricum.*
  - Folia glabra, semiteretia, ½–1 lin. crassa .. 5. *hyacinthoides.*
  - Folia deorsum rigide setosa.
    - Folia recta: antheræ ad faucem tubi sessiles. 6. *setosum.*
    - Folia circinata; stamina infra medium tubi inserta filamentis brevibus .... 7. *ciliare.*
- Ovarium distincte stipitatum.
  - Perianthium 7–8 lin. longa, segmentis tubo subæquantibus. 8. *montanum.*
  - Perianthium 12–18 lin. longum, segmentis tubo 2–3-plo brevioribus .... 9. *concanense.*

§ UROPETALUM (Burchell, Salisb.). *Segmenta exteriora interioribus longiora, caudata.*

- Folia teretia filiformia .... 10. *minimum.*
- Folia anguste linearia, deorsum 3–6 lin. lata.
  - Folia firma, striato-nervosa .... 11. *rigidifolium.*
  - Folia carnoso-herbacea, crispata .... 12. *crispum.*
  - Folia carnoso-herbacea, nullo modo crispata.
    - Bracteæ 1–2 lin. longæ.
      - Folium solitarium; perianthium 4½–5 lin. longum. 13. *unifolium.*
      - Folia 2; perianthium 9–10 lin. longum. 14. *Welwitschii.*
    - Bracteæ lanceolato-acuminatæ 5–6 lin. longæ.
      - Capsula breviter stipitata .... 15. *umbonatum.*
      - Capsula sessilis.
        - Segmenta exteriora ½–1 lin. longiora.
          - Perianthium 4½–5 lin. longum.... 16. *taccazeanum.*
          - Perianthium 7–8 lin. longum .... 17. *erythræum.*
        - Segmenta exteriora 4–6 lin. longiora. 18. *viride.*
- Folia lorata, 4–5 poll. lata .... 19. *glaucum.*

1. D. SEROTINUM, *Medic. et Mœnch. loc. cit.*—Hyacinthus serotinus, *Linn. Sp. Plant.* 453; *Cav. Ic.* t. 30; *Red. Lil.* t. 202.—Scilla serotina, *Bot. Mag.* t. 859.—Uropetalum serotinum, *Gawl. Bot. Reg.* sub t. 156; *Reich. Ic.* x. t. 459; *Kunth, Enum.* iv. 378.—Tricharis serotina, *Salisb. Gen.* 24. Folia 5–6, carnoso-herbacea, glabra, anguste linearia, facie canaliculata, 6–12 poll. longa, 2–3 lin. lata. Scapus 4–12-pollicaris. Racemus laxe 4-12-florus. Pedicelli infimi 3–4 lin. longi. Bracteæ lanceolatæ, 4–6 lin. longæ. Perianthium brunneo-viride, 5–6 lin. longum, segmentis æquilongis tubo 1–1½ lin. crasso longioribus, exterioribus angustioribus margine convolutis flore expanso falcatis. Filamenta ad faucem inserta, antheris breviora. Capsula 5–6 lin. longa et lata, basi angustata, seminibus in loculo 8–12. *Insulæ Fortunatæ; Lusitania; Hispania; Barbaria; Gallia meridionalis; Liguria.*

D. FULVUM, *Webb, Phyt. Can.* iii. 140 (Hyacinthus fulvus, *Cav. Ann.* iii. 47; *Bot. Mag.* t. 1185), est forma robusta floribus flavescentibus.

2. D. UNICOLOR, *Baker.*—Uropetalum unicolor, *Stocks, Hook. Journ.* iv. 180; *Walp. Ann.* vi. 119. Folia 5–6, carnoso-herbacea, glabra, anguste linearia, facie canaliculata, 6–8 poll. longa, 2–3 lin. lata. Scapus 4–8-pollicaris. Racemus laxe 4–6-florus. Pedicelli infimi 2–2½ lin. longi. Bracteæ deltoideo-acuminatæ, 3–4 lin. longæ. Perianthium 7–8 lin. longum, gramineo-viride, segmentis æquilongis tubo 1 lin. crasso æquantibus, exterioribus ligulatis margine convolutis flore expanso paullulum falcatis. Capsula 6–7 lin. longa et lata, basi angustata. *India orientalis; Scinde et Beloochistan,* Stocks, 634! Ad præcedentem arcte affinis.

3. D. LONGIFOLIUM, *Baker.*—Uropetalum longifolium, *Lindl. Bot. Reg.* t. 194; *Kunth, Enum.* iv. 378. Folia 5–6, carnoso-herbacea, glabra, anguste linearia, 18–24 poll. longa vel ultra, deorsum 3–4 lin. lata. Scapus 1–2-pedalis. Racemus laxe 4–8-florus. Pedicelli 2–3 lin. longi. Bracteæ lineari-acuminatæ, 3–6 lin. longæ. Perianthium viride, 6–8 lin. longum, segmentis æquilongis tubo 1 lin. crasso subæquantibus, exterioribus margine convolutis flore expanso falcatis. Antheræ ad faucem subsessiles. Capsula subsessilis. *Africa tropicalis; Mozambique,* Forbes! *Zambesi-land,* Dr. Kirk! *Guinea, in ditione nigritana,* Barter, 3441!

4. D. HYDSURICUM, *Baker.*—Uropetalum hydsuricum, *Edgew. Linn. Trans.* xx. 88. Folia 5–6, carnoso-herbacea, glabra, anguste linearia, canaliculata, 6–9 poll. longa, 2–3 lin. lata. Racemus laxe 5–8-florus. Pedicelli infimi 3–4 lin. longi. Bracteæ deltoideo-acuminatæ, 2–2½ lin. longæ. Perianthium 6 lin. longum, flavo-virescens, segmentis æquilongis tubum paulo excedentibus, exterioribus anguste ligulatis. Filamenta ad faucem inserta, antheris breviora.

Capsula basi angustata, seminibus in loculo 8–9. *India orientalis; Punjaub, prope Loodiana*, Edgeworth!

5. D. HYACINTHOIDES, *Baker*.—Uropetalum hyacinthoides, *Spreng. Cur. Post.* 135; *Kunth, Enum.* iv. 378.—Polemannia hyacinthoides, *Berg. Linnæa*, 1826, 250.—Lachenalia graminifolia, *Soland. MSS.* Folia 2–3, carnoso-herbacea, semiteretia, 4–9 poll. longa, ½–1 lin. crassa, glabra. Scapus 6–12-pollicaris. Racemus laxe 4–9-florus. Pedicelli infimi 2–3 lin. longi. Bracteæ lanceolato-acuminatæ, 3–4 lin. longæ. Perianthium viride vel viridi-flavescens, 6–7 lin. longum, segmentis æquilongis tubo 1 lin. crasso subæquantibus, exterioribus angustioribus margine convolutis flore expanso falcatis. Antheræ ad faucem tubi sessiles. Capsula sessilis. *Cap. B. Spei*, Masson! Burchell! Drege, 1571! Zeyher, 1700! *Natal*, Mrs. Fannin!

6. D. SETOSUM, *Baker*. Folia 4–5, firma, linearia, deorsum 2–3 lin. lata, præcipue ad dorsum setis flavidis firmis instructa. Scapus 4–6-pollicaris. Racemus laxe 5–8-florus. Pedicelli infimi 4–4½ lin. longi. Bracteæ deltoideo-acuminatæ, 2–3 lin. longæ. Perianthium 8–9 lin. longum, viridi-flavescens, segmentis æquilongis tubo 1½ lin. crasso subæquantibus, exterioribus lineari-ligulatis. Antheræ ad faucem tubi sessiles. Capsula sessilis. *Cap. B. Spei, Modderfontyn, Namaqua-land*, Rev. H. Whitehead!

Var. β. READII, *Baker*. Gracilior; folia similiter setosa, vix ultra 1 lin. lata, 3–4 poll. longa; pedicelli 1½–2 lin. longi, bracteis lanceolatis breviores; perianthium 10 lin. longum, segmentis exterioribus magis convolutis, flore expanso falcatis. *Cap. B. Spei, Fuller's Farm*, R. W. Reade, 94! Verisimiliter species vera.

7. D. CILIARE, *Baker*.—Uropetalum ciliare, *Ecklon et Zeyher, MSS.*; *Harv. Thes. Cap.* ii. t. 170. Folia 6–8, carnoso-herbacea, 4–6 poll. longa, deorsum 2–3 lin. lata, valde circinato-convoluta, basin scapi arcte cingentia, præcipue deorsum ad marginem et dorsum setis firmis albidis vestita. Scapus 4–8-pollicaris. Racemus 4–8-florus. Pedicelli floriferi 1½–2 lin. longi. Bracteæ lanceolatæ, 2–3 lin. longæ. Perianthium viride, 7–8 lin. longum, segmentis æquilongis anguste ligulatis tubo 1 lin. crasso subæquantibus, exterioribus lineari-subulatis. Filamenta infra medium tubi inserta, antheris breviora. Capsula sessilis, oblonga, seminibus in loculo 3–4. *Cap. B. Spei*, Zeyher, 48! Cooper, 474, 493! Bowker! *ad ripas fluv. Aapages*, Burke!

8. D. MONTANUM, *Baker*.—Uropetalum montanum, *Dalzell, Kew Journ.* ii. 152. Folia 5–6, carnoso-herbacea, glabra, lineari-subulata, subteretia, 4–6 poll. longa, basi vix ultra 1 lin. crassa. Scapus 6–9-pollicaris. Racemus laxe 6–12-florus. Pedicelli infimi 4–6 lin. longi. Bracteæ lanceolato-acuminatæ, 3–4 lin. longæ. Perianthium albido-virescens, 7–8 lin. longum, segmentis æquilongis tubo 1 lin.

crasso subæquantibus, exterioribus ligulatis. Stamina ad faucem tubi inserta, filamentis antheris brevioribus. Capsula distincte stipitata, seminibus in loculo 5–6. *India orientalis; Bombay,* Dalzell! *Delhi,* Vicary!

9. D. CONCANENSE, *Baker.*—Uropetalum concanense, *Dalzell, Kew Journ.* ii. 142. Folia 3–4, carnoso-herbacea, glabra, lineari-subulata, subteretia, 6–9 poll. longa, vix ultra 1 lin. crassa. Scapus 6–12-pollicaris. Racemus 2–6-florus. Pedicelli floriferi 3–6 lin. longi. Bracteæ deltoideo-acuminatæ, 1½–2 lin. longæ. Perianthium albidum, 12–18 lin. longum, segmentis æquilongis tubo 1–2 lin. crasso 2–3-plo brevioribus, exterioribus ligulatis ecaudatis. Filamenta ad faucem inserta 1½ lin. longa. Capsula distincte stipitata, seminibus in loculo 6–8. *India orientalis; Concan,* Dalzell!

10. D. MINIMUM, *Webb, Phyt. Can.* iii. 341.—Uropetalum minimum, *Steud. in Schimp. Pl. Abyss.* 1168. Folia 2–3, filiformia, carnoso-herbacea, glabra, 2–3 poll. longa, ¼ lin. crassa. Scapus 12–18 lin. longus. Racemus 2–4-florus. Pedicelli 1–1½ lin. longi. Bracteæ lanceolato-acuminatæ, 2–3 lin. longæ. Perianthium viride, 5–6 lin. longum, segmentis exterioribus 1 lin. longioribus tubum 2–3-plo excedentibus. Antheræ ad faucem tubi subsessiles. Ovarium sessile. *Abyssinia,* Schimper, 1168!

11. D. RIGIDIFOLIUM, *Baker.*—Folia 4–5, coriacea, linearia, glabra, 6–8 poll. longa, deorsum 5–6 lin. lata, basin scapi arcte cingentia, crebre lineato-nervosa. Scapus 6–9-pollicaris. Racemus 5–6-florus. Pedicelli 1½–3 lin. longi. Bracteæ lanceolato-acuminatæ, 5–6 lin. longæ. Perianthium viride, 7–8 lin. longum, segmentis interioribus tubo 1 lin. crasso brevioribus, exterioribus 1 lin. longioribus caudatis falcatis. Stamina ad faucem inserta filamentis brevibus. Ovarium sessile. *Cap. B. Spei, ad ripas fluv. Aapages,* Burke!

12. D. CRISPUM, *Baker.*—Uropetalum crispum, *Burch. Gawl. Bot. Reg. sub* t. 156 (*nomen solum*). Folia 5–6, carnoso-herbacea, linearia, glabra, 5–6 poll. longa, deorsum 5–6 lin. lata, marginibus valde crispato-undulatis, in exemplis cultis pedalia vel ultra multo minus crispata. Scapus 6–9-pollicaris. Racemus laxe 6–12-florus. Pedicelli 3–6 lin. longi. Bracteæ lanceolatæ, 2–3 lin. longæ. Perianthium viride, 8–9 lin. longum, segmentis interioribus tubo 1 lin. crasso subæquantibus, exterioribus 1–1½ lin. longioribus caudatis falcatis. Antheræ ad faucem subsessiles. Ovarium sessile. *Cap. B. Spei,* Burchell, 2682!

13. D. UNIFOLIUM, *Baker.*—Uropetalum taccazeanum, var. angustifolium, *Schweinf. Exsic.* 23. Folium solitarium, basin scapi arcte cingens, carnoso-herbaceum, glabrum, anguste lineare, 6–7 poll. longum, 2–2½ lin. latum. Scapus 4–5-pollicaris. Racemus laxe 4–6-

florus. Pedicelli 1–2 lin. longi. Bracteæ pedicellis subæquantes. Perianthium viride, 4½–5 lin. longum, segmentis interioribus tubo 1½ lin. crasso æquantibus, exterioribus caudatis 1 lin. longioribus. Antheræ ad faucem subsessiles. Ovarium sessile. *Callabat,* Schweinfurth, 23!

14. D. WELWITSCHII, *Baker.*—Uropetalum Welwitschii, *Baker in Saund. Ref. Bot.* t. 16. Bulbus globosus, 1 poll. crassus. Folia 2, carnoso-herbacea, glabra, anguste linearia, 2 lin. lata. Scapus 6–8-pollicaris. Racemus laxe 4–6-florus. Pedicelli 1½–3 lin. longi. Bracteæ lanceolatæ, 1½–2 lin. longæ. Perianthium viride, 9–10 lin. longum, segmentis interioribus tubo 1½ lin. crasso subæquantibus, exterioribus 3 lin. longioribus caudatis falcatis. Stamina ad faucem inserta, filamentis antheris subæquantibus. Ovarium oblongum sessile. *Angola,* Welwitsch! v. v. in Hort. Saund.—*Cfr.* U. fesoghlense, *H. G. Solms in Schwein. Beit. Fl. Æthiop.* 204; *Nubia,* Cienkowsky.

15. D. UMBONATUM, *Baker.*—Uropetalum umbonatum, *Baker in Saund. Ref. Bot.* t. 17. Bulbus parvus, ovoideus. Folia 2–3, carnoso-herbacea, glabra, pedalia vel ultra, deorsum 3 lin. lata. Scapus 1–2-pedalis. Racemus laxe 6–12-florus. Pedicelli 2–3 lin. longi. Bracteæ lanceolato-acuminatæ, 4–6 lin. longæ. Perianthium viride vel viridi-flavescens, 7–8 lin. longum, segmentis interioribus tubo 1–1½ lin. crasso æquantibus, exterioribus 1½–2 lin. longioribus caudatis falcatis. Stamina ad faucem inserta, filamentis brevissimis. Capsula breviter stipitata, seminibus in loculo 12–15. *Natal,* Hutton, Krauss, 437! Saunderson, 509!

16. D. TACCAZEANUM, *Baker.*—Uropetalum taccazeanum, *Hochst. in Schimp. Pl. Abyss.* no. 1696; *A. Rich. Fl. Abyss.* ii 325. Folia 2–3, carnoso-herbacea, anguste linearia, 3–4 poll. longa, 3–3½ lin. lata, glabra. Scapus 6–9-pollicaris. Racemus laxe 6–12-florus. Pedicelli 1½–2 lin. longi. Bracteæ lanceolato-acuminatæ, 3–5 lin. longæ. Perianthium viride, 4½–5 lin. longum, segmentis interioribus tubo subæquantibus, exterioribus 1 lin. longioribus, breviter caudatis, deorsum complanatis. Antheræ ad faucem tubi sessiles. Capsula sessilis, obtuse angulata. *Abyssinia,* Schimper, 1696!—U.? depressum, *A. Rich. loc. cit.*, planta altera Abyssinica, ob perianthium ignotum est omnino dubium; Ab *D. taccazeano* differt foliis 4–5 latioribus longioribus et capsula angulis acutioribus.

17. D. ERYTHRÆUM, *Webb, Phyt. Can.* iii. 341. Folia 3–4, carnoso-herbacea, glabra, 9–18 poll. longa, anguste linearia, deorsum 2–3 lin. lata. Scapus 4–9-pollicaris. Racemus 6–12-florus. Pedicelli infimi 2–3 lin. longi. Bracteæ lanceolato-acuminatæ, 5–6 lin. longæ. Perianthium viridi-flavescens, 7–8 lin. longum, segmentis interioribus tubo brevioribus, exterioribus ½–1 lin. longioribus caudatis falcatis.

Antheræ ad faucem sessiles. Capsula sessilis, 6 lin. longa et lata, seminibus in loculo 12–15. *Arabia,* Schimper, 405! Lieut.-Col. Pelly! *Ægyptus,* Wiest, 659!

18. D. VIRIDE, *Mœnch. Meth. Suppl.* 267.—Hyacinthus viridis, *Linn. Sp.* 454; *Jacq. Ic.* t. 66; *Red. Lil.* t. 203.—Lachenalia viridis, *Thunb. Prodr.* 64.—Zuccagnia viridis, *Thunb. Fl. Cap.* 328.—D. filamentorum, *Medic. Ust. Ann.* ii. 13.—Uropetalum viride, *Gawl. Bot. Reg. sub* t. 156; *Kunth, Enum.* iv. 379. Folia 5–6, carnoso-herbacea, anguste linearia, glabra, sæpe pedalia, deorsum 1½–3 lin. lata. Scapus 1–2-pedalis. Racemus laxe 6–15-florus. Pedicelli infimi 2–3 lin. longi. Bracteæ lineari-acuminatæ, 4–6 lin. longæ. Perianthium viride, 12–15 lin. longum, tubo 3–4 lin. longo 1 lin. crasso, segmentis interioribus tubo æquantibus, exterioribus 8–10 lin. longis filiformibus pergracilibus. Stamina ad faucem inserta, filamentis antheris brevioribus. Capsula sessilis, 6–7 lin. longa et lata, seminibus in loculo 15–18. *Cap. B. Spei,* Zeyher, 49! Burke! Harvey! Cooper, 1781! &c.

Var. β. NATALENSE, *Baker.* Robustior; folia firmiora, breviora, deorsum 5–6 lin. lata; perianthium 9–10 lin. longum, segmentis interioribus magis flavescentibus, tubo 1½ lin. crasso, segmentis exterioribus crassioribus 6–7 lin. longis. *Natal,* Saunderson, 430! Mrs. Fannin, 20! Ab typo ad *D. umbonatum* accedens.

19. D. GLAUCUM, *Baker.*—Uropetalum glaucum, *Burchell, Bot. Reg.* t. 156; *Roem. et Schult. Syst.* vii. 619; *Kunth, Enum.* iv. 379. Folia 5–6, carnoso-herbacea, lorata, glauca, pedalia vel ultra, 2½–3 poll. lata. Scapus 2–3-pedalis. Racemus 30–40-florus, 15–18 poll. longus, 4–5 poll. latus. Pedicelli stricte horizontales vel paullulum deflexi, 18–24 lin. longi. Bracteæ lineares, membranaceæ, evanescentes, 3 lin. longæ. Perianthium viridi-flavescens, 12–14 lin. longum, segmentis interioribus tubo subæquantibus, exterioribus 3 lin. longioribus caudatis falcatis. Stamina prope faucem tubi inserta, filamentis brevibus. Capsula breviter stipitata, 9 lin. longa et lata, seminibus in loculo 15–20. *Cap. B. Spei, Namaqua-land,* Burchell, 2066! Ab speciebus reliquis omnibus habitu et magnitudine valde differt.

17. LACHENALIA, *Jacq.*

Jacq. Ic. t. 383; *Endl. Gen.* 1124; *Kunth, Enum.* iv. 283; *Harv. Cap. Gen.* 2nd edit. 394.—Cœlanthus, *Willd. MSS., Kunth, Enum.* iv. 282.—Himas, Platyestes, Monoestes, Chloriza, Orchiops *et* Lachenalia, *Salisb. Gen.* 21.

Perianthium campanulatum vel tubulosum, tubo campanulato, segmentis inæqualibus tubo multoties longioribus, 3 exterioribus ligulatis valvatis dorso sub apice gibbosis, 3 interioribus plerumque longioribus imbricatis ligulato-spathulatis ore plus minus distincte patulis. *Stamina* ad faucem tubi subuniseriatim inserta, filamentis filiformibus declinatis sæpe exsertis, antheris oblongis versatilibus. *Ovarium* sessile, oblongum, trisulcatum, ovulis in loculis pluribus; *stylus* filiformis, cum filamentis declinatus; *stigma* capitatum. *Capsula* membranacea, obovata, trisulcata, loculicide trivalvis, seminibus in loculis 6–12 lagenæformibus parvis haud compressis. *Testa* nitida, nigra. *Herbæ bulbosæ bulbis membranaceo-tunicatis, foliis synanthiis plerumque 2 oppositis carnoso-herbaceis, rarius 1 vel multis, floribus racemosis sæpe speciosis, superioribus racemorum sæpe parvis abortivis.*

§ EULACHENALIA. *Perianthium æqualiter tubulosum, quadruplo longius quam crassum, basi rotundatum.*

Segmenta exteriora interioribus subæquantia. 1. *pendula.*
Segmenta exteriora interioribus distincte breviora. 2. *rubida.*
Segmenta exteriora interioribus subduplo breviora. 3. *tricolor.*

§ CŒLANTHUS (Willd.). *Perianthium ventricoso-tubulosum, 3–4-plo longius quam crassum, basi valde obliquum.*

Species sola .... 4. *reflexa.*

§ ORCHIOPS (Salisb.). *Perianthium tubulosum, 2–3-plo longius quam crassum.*

Flores subspicati.
Folia plurima, subteretia .... 5. *orthopetala.*
Folia 2, raro 3, lanceolata.
Perianthium 4–5 lin. longum .... 6. *orchioides.*
Perianthium 6–7 lin. longum .... 7. *glaucina.*
Perianthium 7–10 lin. longum ...... 8. *pallida.*
Flores racemosi.
Folium semper solitarium, lineare, basi dilatatum. 9. *unifolia.*
Folia 2, lanceolata.
Segmenta omnia subæqualia .... 10. *isopetala.*
Segmenta interiora distincte longiora.
Folia facie lævia .... 11. *patula.*
Folia facie dense pustulata .... 12. *liliiflora.*

§ CHLORIZA (Salisb. extens.). *Perianthium tubuloso-campanulatum vel campanulatum, 0–2-plo longius quam crassum.*

Flores subspicati.
Folia plurima, subteretia .... 13. *contaminata.*
Folia 2, lanceolata.
Bracteæ minutæ, deltoideæ .... 14. *pustulata.*
Bracteæ lineari-subulatæ, 3–4 lin. longæ.
15. *carnosa.*

Flores racemosi.
Folium solitarium.
Folium lineari-subulatum, semiteres .. 16. *Zeyheri.*
Folium lineare, deorsum 3–6 lin. latum.
Folium glabrum; perianthium campanulatum.
17. *convallarioides.*
Folium setosum; perianthium tubuloso-campanulatum.
18. *hirta.*
Folium lanceolatum, deorsum 1 poll. latum.
19. *anguinea.*

Folia 2 vel raro 3.
Stamina inclusa.
Folia facie lævia.
Folia lorata, subpedalia .... 20. *mediana.*
Folia lanceolata, semipedalia .... 21. *lucida.*
Folia facie pustulata.
Segmenta subæquilonga .... 22. *racemosa.*
Segmenta exteriora distincte breviora.
23. *Cooperi.*
Stamina perianthio sesqui vel demum subduplo longiora.
Folia lineari-subulata, semiteretia .. 24. *juncifolia.*
Folia lanceolata.
Perianthium campanulatum, segmentis interioribus falcato-patulis .... 25. *purpureo-cærulea.*
Perianthium tubuloso-campanulatum, segmentis interioribus leviter patulis.
Pedicelli $1\frac{1}{2}$–2 lin. longi ...... 26. *versicolor.*
Pedicelli 4–5 lin. longi........ 27. *violacea.*
Folia ovato-oblonga, subduplo longiora quam lata.
Folia lineato-nervosa .... 28. *nervosa.*
Venæ foliorum inconspicuæ...... 29. *Bowieana.*

1. L. PENDULA, *Ait. Kew.* i. 461; *Thunb. Fl. Cap.* 328; *Jacq. Ic.*

t. 400; *Red. Lil.* t. 52; *Bot. Mag.* t. 490; *Andr. Bot. Rep.* t. 62; *Kunth, Enum.* iv. 291; *Salisb. Gen.* 2. Folia 22, carnoso-herbacea, lorato-lanceolata, 6–9 poll. longa, deorsum 1½–2 poll. lata, interdum leviter maculata. Scapus 4–9 poll. longus. Racemus 2–4 poll. longus, 2–2½ poll. latus, 6–15-florus. Bracteæ deltoideæ. Pedicelli 2–3 lin. longi. Perianthium 12–15 lin. longum, 3–3½ lin. crassum, æqualiter tubulosum, saturate flavo-coccineo-purpureum, segmentis exterioribus ligulatis 8–9 lin. longis 2½–3 lin. latis obtusis, interioribus ligulato-spathulatis 9–10 lin. longis. Stamina segmentis subæquantia. *Cap. B. Spei*, Burchell, 8573! Zeyher! Harvey, 111! Dr. Prior, &c. Species maxima et speciosissima omnium.

2. L. RUBIDA, *Jacq. Ic.* t. 398; *Tratt. Tab.* t. 145; *Bot. Mag.* t. 993; *Kunth, Enum.* iv. 291; *Salisb. Gen.* 22. Folia 2, carnoso-herbacea, lanceolata, 5–6 longa, 1 poll. lata, acuta, basi angustata, plus minus distincte maculata. Scapus 6–8 poll. longus, maculatus. Racemus 2–3 poll. longus, 2 poll. latus, 6–15-florus. Bracteæ deltoideæ. Pedicelli ½–1 lin. longi. Perianthium 12–13 lin. longum, 3 lin. crassum, æqualiter tubulosum, rubidum, segmentis exterioribus 7–8 lin., interioribus 9–10 lin. longis. Stamina segmentis longioribus subæquantia. *Cap. B. Spei*, Drège! Zeyher! *Namaqua-land*, Rev. H. Whitehead!

Var. β. TIGRINA, *Gawl. Bot. Mag. sub* t. 993.—L. tigrina, *Jacq. Ic.* t. 399; *Kunth, Enum.* iv. 291. Sepala exteriora pallida, lineis dorsalibus et punctis densissimis rubris maculata. *Cap. B. Spei.*

Var. γ. PUNCTATA, *Gawl. loc. cit.*—L. punctata, *Jacq. Ic.* t. 397; *Kunth, loc. cit.* Sepala exteriora incarnata, maculis densis sanguineis notata. *Cap. B. Spei*, Zeyher, 1697!

3. L. TRICOLOR, *Thunb. Prodr.* 64. *Fl. Cap.* 327; *Bot. Mag.* t. 82; *Red. Lil.* t. 2; *Kunth, Enum.* iv. 290.—Phormium alooides, *Linn. Suppl.* 205. Folia 2, carnoso-herbacea, lorato-lanceolata, 6–9 poll. longa, 6–18 lin. lata, sursum sensim angustata, interdum maculata. Scapus 3–12 poll. longus. Racemus 2–4 poll. longus, 21–24 lin. latus, 6–18-florus. Bracteæ deltoideæ. Pedicelli inferiores 2–3 lin. longi. Perianthium 9–12 lin. longum, 2½–3 lin. crassum, æqualiter tubulosum, saturate flavo-coccineo-viride, segmentis exterioribus lanceolatis 4–4½ lin. longis, 2 lin. latis, interioribus ligulato-spathulatis 7–9 lin. longis, 3 lin. latis. Stamina segmentis longioribus subæquantia. *Cap. B. Spei*, Masson! Zeyher, 1696! Burchell! Drège, 8624!—L. quadricolor, *Jacq. Ic.* t. 396; *Andr. Bot. Reg.* t. 148; vix differt nisi perianthio magis varie colorato.—L. luteola, *Jacq. Ic.* t. 395; *Red. Lil.* t. 297 (L. quadricolor, var. lutea, *Bot. Mag.* t. 1704); est forma perianthio omnino luteo.

4. L. REFLEXA, *Thunb. Prodr.* 64, *Fl. Cap.* 327; *Roem. et Schult.*

Syst. vii. 612, *non Andrews.*—Cœlanthus complicatus, *Willd. Herb. Roem. et Schult. Syst.* vii. xlvi, in adnot.; *Kunth, Enum.* iv. 282. Folia 2, carnoso-herbacea, lanceolata, 3–4 poll. longa, falcata, scapi basin arcte cingentia. Scapus 1–3 poll. longus. Flores 3–6, subsessiles, vel breviter pedicellati ascendentes. Bracteæ lanceolatæ, 1½–2 lin. longæ. Perianthium flavidum, 9–12 lin. longum, medio 3 lin. crassum, ventricoso-tubulosum, basi valde obliquum, segmentis exterioribus lanceolatis, 2½–3 lin. latis, interioribus paulo brevioribus. Stamina inclusa. *Cap. B. Spei,* Drège! Harvey, 112! Zeyher, 4292! &c.

5. L. ORTHOPETALA, *Jacq. Ic.* t. 3856; *Tratt. Tab.* t. 164; *Kunth, Enum.* iv. 286. Folia 4–5, carnoso-herbacea, lineari-subulata, subteretia, 3–6 poll. longa, basi 3–4 lin. lata. Scapus 4–6-pollicaris. Flores 20–30 dense subspicati, erecto-patentes. Pedicelli brevissimi vel subnulli. Bracteæ minutæ, deltoideæ. Perianthium tubulosum, 4½ lin. longum, 1½ lin. crassum, albidum, segmentis exterioribus 1 lin. latis, dorso rubro tinctis, interioribus subrectis paulo brevioribus. Stamina petalis interioribus subæquantia. *Cap. B. Spei,* Drège!

6. L. ORCHIOIDES, *Ait. Kew.* i. 460; *Jacq. Ic.* t. 390; *Bot. Mag.* t. 854, 1269; *Kunth, Enum.* iv. 284; *Baker, in Saund. Ref. Bot.* t. 171.—L. pulchella, *Kunth, Enum. loc. cit.*—L. mutabilis, *Sweet, Flow. Gard.* ser. ii. t. 129; *Lodd. Bot. Cab.* t. 1076. Folia 2, raro 3, carnoso-herbacea, lanceolata, 3–8 poll. longa, deorsum 12–18 lin. lata, sæpe maculata, margine cartilaginea. Scapus 3–9-pollicaris, sæpe maculatus. Flores 12–50, subspicati. Spica 2–6 poll. longa, expansa 9–12 lin. lata. Perianthium albidum vel flavidum vel plus minus rubro vel cæruleo tinctum, breviter tubulosum, 4–5 lin. longum, 2 lin. crassum, segmentis exterioribus brevioribus. Stamina inclusa vel demum leviter exserta. *Cap. B. Spei,* Masson! Drège, 8628! Burchell, 1534! 7478! Zeyher, 4286! 4289! &c.; *Namaqua-land,* Rev. H. Whitehead!

7. L. GLAUCINA, *Jacq. Ic.* t. 391; *Willd. Sp. Plant.* ii. 171; *Hook. in Bot. Mag.* t. 3552; *Kunth, Enum.* iv. 284.—L. sessilifolia, *Andr. Bot. Rep.* t. 460. Folia 2, raro 3, carnoso-herbacea, lanceolata, 3–6 poll. longa, 9–12 lin. lata, margine cartilaginea, sæpe maculata. Scapus 3–6-pollicaris. Flores 6–20, subspicati. Spica 1½–3 poll. longa, expansa 12–15 lin. lata. Perianthium albidum vel plus minus flavo vel rubro tinctum, tubulosum, 6–7 lin. longum, 2–2½ lin. crassum, segmentis exterioribus distincte brevioribus. Stamina inclusa vel demum leviter exserta *Cap. B. Spei,* Masson! Niven! Drège, 1492 *b*! Zeyher, 4287–8! &c. Ad præcedentem arcte affinis.

8. L. PALLIDA, *Ait. Kew.* i. 640; *Thunb. Fl. Cap.* 327; *Willd. Sp.* ii. 172; *Lindl. Bot. Reg.* t. 1350 et 1945; *Kunth, Enum.* iv. 284; *Baker in Saund. Ref. Bot.* t. 170, *non Bot. Reg.* t. 287, *nec Red.*

Lil. t. 22. Folia 2, carnoso-herbacea, lanceolata, 6–12 poll. longa, margine cartilaginea. Scapus 6–9-pollicaris. Flores 6–20, subspicati. Spica 1½–3 poll. longa, expansa 15–18 lin. lata. Perianthium albidum vel plus minus rubro tinctum, tubulosum, 8–10 lin. longum, 2–2½ lin. crassum, segmentis exterioribus 4–4½, interioribus 6 lin. longis. Stamina inclusa. *Cap. B. Spei,* Drège, 1192*a*! Villette! Vix aliud quam varietas major præcedentis.

9. L. UNIFOLIA, *Jacq. Schœnbr.* i. 43, t. 83; *Bot. Mag.* t. 766; *Willd. Sp. Plant.* ii. 178; *Kunth, Enum.* iv. 289.—Monoestes unifolia, *Salisb. Gen.* 21. Folium semper solitarium, carnoso-herbaceum, lineare, 6–12 poll. longum, deorsum dilatatum, sanguineo-saturatum vel maculatum, basin scapi arcte amplectens. Scapus 4–15 poll. longus. Racemus 2–5 poll. longus, 15–18 lin. latus, 12–20-florus. Pedicelli 2–3 lin. longi. Bracteæ lanceolato-deltoideæ, 1 lin. longæ. Perianthium tubulosum, 6–7 lin. longum, 2 lin. crassum, albidum, segmentis exterioribus 2 lin. latis, interioribus paulo brevioribus. Stamina segmentis interioribus subæquantia. Stylus demum exsertus. *Cap. B. Spei,* Masson! Niven! Drège, 477! Zeyher! &c.

10. L. ISOPETALA, *Jacq. Ic.* t. 401; *Willd. Sp. Plant.* ii. 179; *Kunth, Enum.* iv. 286.—L. rosea, *Andr. Rep.* t. 296; *Kunth, loc. cit.*—L. bifolia, *Gawl. Bot. Mag.* t. 1611; *Kunth, l. c.* Folia 2, carnoso-herbacea, lorato-lanceolata, acuta, 6–9 poll. longa, deorsum 6–9 lin. lata, immaculata. Scapus 4–8-pollicaris. Racemus 2–5 poll. longus, 12–30-florus. Bracteæ deltoideæ. Pedicelli inferiores 1–1½ lin. longi. Perianthium campanulato-tubulosum, albidum vel plus minus rubro tinctum, 4–4½ lin. longum, 2 lin. crassum, segmentis omnibus subæquilongis. Stamina inclusa. Stylus demum exsertus. *Cap. B. Spei,* Zeyher! Thom! Harvey! Burchell, 6188! &c.

11. L. PATULA, *Jacq. Ic.* t. 384; *Willd. Sp. Plant.* ii. 175; *Tratt. Tab.* t. 156; *Kunth, Enum.* iv. 288. Folia 2, carnoso-herbacea, anguste lanceolata, 4–6 poll. longa, immaculata. Scapus foliis excedens. Racemus sublaxe 15–20-florus, 2–3 poll. longus, expansus circiter 2 poll. latus. Pedicelli erecto-patentes, infimi 3–4 lin. longi. Perianthium 8–10 lin. longum, 2½ lin. crassum, albido-rubrum, segmentis exterioribus distincte brevioribus. Stamina inclusa. *Cap. B. Spei.*

12. L. LILIIFLORA, *Jacq. Ic.* t. 387; *Tratt. Tab.* t. 137; *Willd. Sp.* ii. 126; *Kunth, Enum.* iv. 286. Folia 2, carnoso-herbacea, lanceolata, 4–6 poll. longa, 9–12 lin. lata, facie dense pustulata. Scapus foliis subæquans. Racemus 12–20-florus, 3–4 poll. longus, 18–21 lin. latus. Pedicelli 1–1½ lin. longi. Perianthium albidum, tubulosum, 8–9 lin. longum, 2–2½ lin. crassum, segmentis exterioribus distincte brevioribus. Stamina segmentis interioribus subæquantia. *Cap. B. Spei.*

13. L. CONTAMINATA, *Ait. Kew.* i. 460; *Thunb. Prodr.* 64; *Bot. Mag.* t. 1401.—L. hyacinthoides, *Jacq. Ic.* t. 382; *Willd. Sp.* ii.

173; *Kunth, Enum.* iv. 285.—L. angustifolia, *Jacq. Ic.* t. 381; *Bot. Mag.* t. 735; *Red. Lil.* t. 162.—L. albida, *Tratt. Tab.* t. 162.—Himas angustifolia et hyacinthoides, *Salisb. Gen.* 21. Folia 6-10, semiteretia, 3-8 poll. longa, basi 1½-2 lin. crassa, facie canaliculata, sæpe maculata. Scapus 2-6-pollicaris. Flores 20-40 dense subspicati. Spica 1-3 poll. longa, expansa 6-7 lin. crassa. Perianthium campanulatum, albidum, sæpe plus minus rubro tinctum, 2¾-3 lin. longum, 1½ lin. crassum, segmentis exterioribus vix brevioribus. Stamina segmentis exterioribus subæquantia. *Cap. B. Spei,* Burchell! Zeyher, 4296! Cooper! Admiral Sir F. Grey! &c.

14. L. PUSTULATA, *Jacq. Ic.* t. 386; *Bot. Mag.* t. 817; *Willd. Sp.* ii. 176; *Andr. Bot. Rep.* t. 350; *Kunth, Enum.* iv. 287.—L. declinata, *Dietr. Lex.* iv. 292.—Chloriza pustulata, *Salisb. Gen.* 21. Folia 2, carnoso-herbacea, lanceolata, 6-9 poll. longa, 8-12 lin. lata, facie pustulata. Scapus foliis subæquans. Flores 12-20 subspicati. Spica densa, 1½-2 poll. longa, 7-8 lin. crassa. Bracteæ minutæ, deltoideæ. Perianthium albidum, 3 lin. longum, 1½ lin. crassum, segmentis omnibus subæquilongis. Stamina haud vel vix exserta. *Cap. B. Spei,* Burchell!

15. L. CARNOSA, *Baker.* Folia 2, carnoso-coriacea, ovato-oblonga, margine cartilaginea, 3-4 poll. longa, 12-15 lin. lata, obtusa, lævia, scapum arcte cingentia. Scapus pollicaris. Flores 30-40, dense subspicati. Spica 2-2½ poll. longa, 1 poll. crassa. Bracteæ lineari-subulatæ, membranaceæ, roseæ, 3-4 lin. longæ, ante anthesin alabastro longiores. Perianthium tubuloso-campanulatum, 3½-4 lin. longum, 2 lin. crassum, segmentis exterioribus paulo brevioribus. Stamina inclusa. *Cap. B. Spei,* Drège, 2689*a*!

16. L. ZEYHERI, *Baker.* Folium semper solitarium, firmum, semiteres, 6-9 poll. longum, 1 lin. crassum. Scapus 6-9-pollicaris. Racemus 12-20-florus, 12-18 lin. longus, expansus 7-8 lin. latus. Bracteæ perminutæ, deltoideæ. Pedicelli 1 lin. longi. Perianthium campanulatum, albidum, rubro-tinctum, 2 lin. longum et crassum, segmentis omnibus subæquilongis. Stamina distincte inclusa. *Cap. B. Spei,* Zeyher, 1694!

17. L. CONVALLARIOIDES, *Baker.* Folium semper solitarium, carnoso-herbaceum, anguste lineare, 3-4 poll. longum, 2-2½ lin. latum, deorsum scapum arcte cingens. Scapus 4-5-pollicaris. Racemus 6-12-florus, 9-12 lin. longus, expansus 8-9 lin. latus. Bracteæ perminutæ, deltoideæ. Pedicelli 2 lin. longi. Perianthium campanulatum, albidum, plus minus rubro tinctum, 2 lin. longum, 1½ lin. crassum, segmentis omnibus subæqualibus. Stamina inclusa. *Kaffraria,* Bowker, 444!

Var. β. ROBUSTA, *Baker.* Robustior, foliis 4-7 poll. longis, deorsum 5-6 lin. latis, raro geminatis, floribus 20-30 cum bracteis paulo majoribus. *Albany,* Williamson!

18. L. HIRTA, *Thunb. Prodr.* 64; *Fl. Cap.* 327; *Willd. Sp. Plant.* ii. 178; *Kunth, Enum.* iv. 289. Folium semper solitarium, lineare, 7–8 poll. longum, deorsum dilatatum et basin scapi arcte cingens, facie setis firmis brunneis dense vestitum. Scapus 8–10-pollicaris maculatus. Racemus 12–20-florus, 2–3 poll. longus, 1 poll. latus. Bracteæ minutæ, deltoideæ. Pedicelli infimi 3–4 lin. longi. Perianthium tubuloso-campanulatum, albidum, rubro tinctum, 4 lin. longum, 2½ lin. latum, segmentis exterioribus distincte brevioribus. Stamina inclusa. *Cap. B. Spei,* Masson!

19. L. ANGUINEA, *Sweet, Hort. Brit.* 420; *Flow. Gard.* ii. t. 179; *Kunth, Enum.* iv. 289. Folium semper solitarium, lanceolatum, carnoso-herbaceum, 6–7 poll. longum, 1 poll. latum, maculatum, basin scapi arcte cingens. Scapus 5–6-pollicaris, maculatus. Racemus circiter 20-florus, 2½–3 poll. longus, 2 poll. latus. Pedicelli infimi 5–6 lin. longi. Perianthium tubuloso-campanulatum, albidum, 4–4½ lin. longum, 2½–3 lin. crassum, segmentis subæquilongis viridi apiculatis. Stamina et stylus perianthio sesqui longiora. *Cap. B. Spei.*

20. L. MEDIANA, *Jacq. Ic.* t. 392; *Roem. et Schult. Syst.* vii. 604; *Kunth, Enum.* iv. 287.—Chloriza mediana, *Salisb. Gen.* 21. Folia 2, carnoso-herbacea, subpedalia, lorato-lanceolata, 1 poll. lata, facie lucida. Scapus gracilis, foliis subæquans. Racemus 20–30-florus, 2–3 poll. longus. Pedicelli infimi 1–1½ lin. longi. Bracteæ deltoideæ, 1 lin. longæ. Perianthium albidum, plus minus viridi tinctum, 4 lin. longum, 2 lin. crassum, segmentis interioribus paulo longioribus. Stamina perianthio æquantia. *Cap. B. Spei* (*v. s. in Herb. Mus. Brit. ex Hort. Kew. anno* 1784).

21. L. LUCIDA, *Gawl. Bot. Mag.* t. 1372; *Roem. et Schult. Syst.* vii. 605; *Kunth, Enum.* iv. 287.—L. pallida, *Redouté, Lil.* t. 22; *Bot. Reg.* t. 287.—L. fragrans, *Andr. Rep.* t. 302, non *Jacq.*—L. latifolia, *Tratt. Tab.* t. 142.—Chloriza lucida, *Salisb. Gen.* 21. Folia 2, carnoso-herbacea, lanceolata, 5–6 poll. longa, 1 poll. lata, facie lævia. Scapus 4–6-pollicaris. Racemus 10–15-florus, 1½–2 poll. longus, 9–10 lin. latus. Bracteæ minutæ, deltoideæ. Pedicelli infimi 1½–2 lin. longi. Perianthium albidum, flavo vel rubro tinctum, 4 lin. longum, 2 lin. crassum, segmentis exterioribus paulo brevioribus. Stamina segmentis interioribus æquantia. *Cap. B. Spei,* Drège, 8628!

22. L. RACEMOSA, *Gawl. Bot. Mag.* t. 1517; *Roem. et Schult. Syst.* vii. 608; *Kunth, Enum.* iv. 287.—Platyestes racemosa, *Salisb. Gen.* 21. Folia 2, raro 3, carnoso-herbacea, lanceolata, 5–6 lin. longa, 10–12 lin. lata, facie dense pustulata. Scapus 3–4-pollicaris, vix maculatus. Racemus 12–20-florus, 2–3 poll. longus, 1 poll. latus. Bracteæ deltoideæ, 1 lin. longæ. Pedicelli infimi 2½–3 lin. longi. Perianthium albidum, vix rubro tinctum, 3–3½ lin. longum, 2 lin. crassum,

segmentis interioribus vix longioribus. Stamina demum distincte exserta. *Cap. B. Spei* (*v. v. cult. in Hort. Saundersii*).

23. L. COOPERI, *Baker*. Folia 2, carnoso-herbacea, lanceolata, 5–6 poll. longa, 9–10 lin. lata, faciei triente exteriore pustulato. Scapus 3–4-pollicaris. Racemus 20–30-florus, 3–4 poll. longus, 15 lin. latus. Bracteæ minutæ, deltoideæ. Pedicelli infimi 3–4 lin. longi. Perianthium albido-rubrum, 4 lin. longum, 2–2½ lin. crassum, segmentis exterioribus distincte brevioribus. Stamina segmentis exterioribus æquantia. *Cap. B. Spei* (*v. v. cult. in hort. Saundersii*).

24. L. JUNCIFOLIA, *Baker*. Folia 2, semiteretia, carnoso-herbacea, lævia, 4–8 poll. longa, deorsum 1½–2 lin. crassa. Scapus 3–4-pollicaris. Racemus 6–12-florus, 9–18 lin. longus, 9–10 lin. crassus. Bracteæ minutæ, deltoideæ. Pedicelli 1½–2 lin. longi. Perianthium albidum, rubro tinctum, tubuloso-campanulatum, 2½ lin. longum, 1½ lin. crassum, segmentis æquilongis. Stamina perianthio sesqui longiora. *Cap. B. Spei*, Ecklon et Zeyher, Asphod. 51 !

25. L. PURPUREO-CÆRULEA, *Jacq. Ic.* t. 388; *Bot. Mag.* t. 745; *Andr. Bot. Rep.* t. 251; *Kunth, Enum.* iv. 288.—L. botryoides, *Tratt. Tab.* t. 140.—Platyestes purpureo-cærulea, *Salisb. Gen.* 21. Folia 2, raro 3, carnoso-herbacea, lanceolata, pustulata, 6–8 poll. longa, 8–9 lin. lata. Scapus 6–9-pollicaris. Racemus 30–40-florus, 4–5 poll. longus, 12–15 lin. crassus. Bracteæ minutæ, deltoideæ. Pedicelli 1½–2 lin. longi. Perianthium campanulatum, purpureo-cæruleum, 3½–4 lin. longum, segmentis interioribus falcato-patulis paulo longioribus. Stamina perianthio sesqui longiora, divergentia. *Cap. B. Spei.*

26. L. VERSICOLOR, *Baker*.

α. UNICOLOR, *Baker*.—L. unicolor, *Jacq. Ic.* t. 389; *Roem. et Schult. Syst.* vii. 607; *Kunth, Enum.* iv. 288. Folia 2, carnoso-herbacea, lanceolata, 3–5 poll. longa, 12–24 lin. lata, lævia vel raro paulo pustulata. Scapus 4–8-pollicaris. Racemus 2–4 poll. longus, 12–15 lin. latus, 30–60-florus. Bracteæ minutæ, deltoideæ. Pedicelli 1½–2 lin. longi. Perianthium tubuloso-campanulatum, 3–3½ lin. longum, 2 lin. crassum, saturate rubrum, segmentis interioribus leviter patulis paulo longioribus. Stamina subrecta, perianthio demum sesqui longiora. *Cap. B. Spei*, Mundt ! Burchell, 6346 ! Thom ! Ecklon et Zeyther, Lach. 43 ! &c.

β. PURPUREA, *Baker*.—L. purpurea, *Jacq.* t. 393; *Willd. Sp.* ii. 177; *Kunth, Enum.* iv. 289. Segmenta exteriora albida; interiora purpurea. *Cap. B. Spei.*

γ. FRAGRANS, *Baker*.—L. fragrans, *Jacq. Schœn.* t. 82; *Willd. Sp.* ii. 176; *Kunth, Enum.* iv. 287. Gracilior, perianthio albido, leviter rubro tincto. *Cap. B. Spei.*

27. L. VIOLACEA, *Jacq. Ic.* t. 394; *Willd. Sp.* ii. 177; *Kunth, Enum.* iv. 289.—L. bicolor, *Lodd. Bot. Cab.* t. 1129; *Kunth, loc. cit.* Folia 2, carnoso-herbacea, lorata, 8–9 poll. longa, 18–21 lin. lata, lævia, maculata. Scapus ultrapedalis. Racemus 4–5 poll. longus, 18–21 lin. latus, 30–50-florus. Bracteæ minutæ, deltoideæ. Pedicelli infimi 4–5 lin. longi. Perianthium tubuloso-campanulatum, 4–4½ lin. longum, 2–2½ lin. crassum, albidum violaceo et viridi tinctum, segmentis exterioribus paulo brevioribus. Stamina subrecta, perianthio sesqui longiora. *Cap. B. Spei.*

28. L. NERVOSA, *Gawl. Bot. Mag.* 1497; *Roem. et Schult. Syst.* vii. 607; *Kunth, Enum.* iv. 288.—Platyestes nervosa, *Salisb. Gen.* 21. Folia 2, carnosa-herbacea, ovato-oblonga patula, immerse nervosa, obtusiuscula, 3–4 poll. longa, 2–2½ poll. lata, lævia vel rarius paulo pustulata. Scapus 3–6-pollicaris. Racemus 30–50-florus, 4–6 poll. longus, 15–18 lin. latus. Bracteæ minutæ, deltoideæ. Pedicelli 1–1½ lin. longi. Perianthium tubuloso-campanulatum, albidum, viridi et rubro tinctum, 3½–4 lin. longum, 2 lin. crassum, segmentis exterioribus paulo brevioribus. Stamina perianthio sesqui vel demum subduplo longiora. *Cap. B. Spei* (*v. tab. ex exemplo in Hort. Kew. cult. a* Bowie *lecto*).

29. L. BOWIEANA, *Baker.*—Folia 2, carnoso-herbacea, ovato-oblonga, patula, vix lineata, 2–2½ poll. longa, 12–15 lin. lata, lævia, rubro maculata. Scapus 5–6-pollicaris. Racemus 20–30-florus, 3–4 poll. longus, 15–18 lin. latus. Bracteæ minutæ, deltoideæ. Pedicelli 1½ lin. longi. Perianthium tubuloso-campanulatum, rubro tinctum, 3½–4 lin. longum, 2 lin. crassum, segmentis exterioribus paulo brevioribus. Stamina perianthio sesqui longiora. *Cap. B. Spei* (*v. tab. ex exemplo in Hort. Kew. cult. a* Bowie *lecto*).

18. VELTHEIMIA, *Gleditsch.*

Gleditsch, Act. Berol. 1769, p. 66; *Endl. Gen.* 1121; *Kunth, Enum.* iv. 281; *Salisb. Gen.* 22; *Harv. Cape Gen.* 2nd edit. 394. —Aletris, sp., *Linn. &c.*

Perianthium longe tubuloso-gamophyllum, segmentis perparvis deltoideis æqualibus erectis. *Stamina* ad medium tubi, uniseriata, filamentis filiformibus, antheris parvis oblongis inclusis versatilibus. *Ovarium* oblongo-cylindricum, sessile, ovulis in loculis 2–3; *stylus* elongatus, filiformis; *stigma* trisulcatum. *Capsula* sessilis, magna, membranacea, obovoidea, acute trisulcata, loculicide trivalvis, seminibus solitariis turbinatis haud compressis. *Testa* nigra. *Herbæ bulbosæ, foliis pluribus loratis carnoso-herbaceis synanthiis, floribus speciosis dense racemosis.*

Bracteæ floribus æquantes .... 1. *bracteata.*
Bracteæ floribus 2–3-plo breviores.
  Folia viridia. Perianthium 15–18 lin. longum. 2. *viridifolia.*
  Folia glauca. Perianthium 9–12 lin. longum. 3. *glauca.*

1. V. BRACTEATA, *Harv. MSS.* Folia non vidi. Racemus primum conicus, demum 2 poll. latus. Pedicelli subnulli. Perianthium flavescens, 10–13 lin. longum, exsiccatum 2½–3 lin. crassum. Bracteæ lineares, longe acuminatæ, 9–12 lin. longæ. *Kaffraria*, Cooper, 320!

2. V. VIRIDIFOLIA, *Jacq. Schoen.* t. 78; *Willd. Sp.* ii. 181; *Lodd. Bot. Cab.* t. 1245.—V. capensis, *Red. Lil.* t. 193.—Aletris capensis, *Linn. Sp.* 456; *Bot. Mag.* t. 501. Folia 10–12, lorata, 8–12 poll. longa, 2½–3 poll. lata, viridia, margine undulata. Scapus 12–18 poll. longus. Racemus 3–4 poll. longus, 3 poll. crassus, 40–60-florus. Perianthium rubidum vel flavescens, maculatum, 15–18 lin. longum, exsiccatum 3–3½ lin. crassum. Pedicelli 2–3 lin. longi. Bracteæ lanceolatæ, 4–6 lin. longæ. *Cap. B. Spei.*

3. V. GLAUCA, *Jacq. Schoen.* t. 77; *Willd. Sp. Plant.* ii. 182; *Bot. Mag.* t. 1091 et 3456; *Red. Lil.* t. 440; *Kunth, Enum.* iv. 282. Folia angustiora, glauca, valde undulata. Scapus pedalis vel ultra. Racemus 2–6 poll. longus, 18–24 lin. latus. Pedicelli vix ultra 1 lin. longi. Bracteæ lineares, 3–4 lin. longæ. Perianthium 9–12 lin. longum, rubro maculatum, vel flavescens, exsiccatum 1½ lin. crassum. *Cap. B. Spei*, Pappe! Zeyher, 1719! Harvey! &c.; *Namaqualand*, Rev. H. Whitehead!

19. MUSCARI, *Tourn.*

Tourn. Inst. 347, t. 180; *Mill. Dict.*; *Endl. Gen.* 1118; *Kunth, Enum.* iv. 313.—Botryanthus, *Kunth, Enum.* iv. 310.—Leopoldia, *Parlatore, Fl. Palerm.* i. 438; *Webb. Phyt. Can.* iii. 341.—Moscharia et Botryophile, *Salisb. Gen.* 25.—Hyacinthus, *Linn. ex parte.*

Perianthium urceolato-tubulosum, sub ore distincte constrictum, dentibus parvis deltoideis plerumque reflexis. *Stamina* in tubo biseriata, filamentis filiformibus vel deorsum complanatis, vix antheris parvis versatilibus oblongo-rotundatis longioribus. *Ovarium* sessile, globoso-trigonum, ovulis in loculis 2 superpositis; *stylus* filiformis; *stigma* capitatum. *Capsula* sessilis, globosa, acute trigona, seminibus in loculo 1–2, parvis haud compressis. *Testa* nigra, nitida. *Herbæ bulbosæ, bulbis membranaceo-tunicatis, foliis semper synanthiis, floribus racemosis parvis saturate cæruleis vel albis vel viridescenti-cæruleis, supremis sæpissime abortivis.*

§ Moscharia (Salisb.). *Perianthium tubuloso-urceolatum, segmentis rotundatis crassis brevissimis stellatim patentibus.*

Folia subpedalia .... 1. *moschatum.*
Folia 2–3-pollicaria .... 2. *alpinum.*

§ Leopoldia (Parlatore). *Perianthium obovoideo-urceolatum, sursum sulcatum, 3–4 lin. longum, segmentis deltoideis reflexis. Racemus laxus elongatus. Coma florum sterilium conspicua.*

Pedicelli infimi brevissimi .... 3. *Cupanianum.*
Pedicelli infimi demum 2–4 lin. longi.
  Racemus expansus 2–4 poll. longus.
    Perianthium 3 lin. longum .... 4. *caucasicum.*
    Perianthium 4–4½ lin. longum .... 5. *bootanense.*
  Racemus expansus 6–12 poll. longus.
    Coma corymbosa, pedicellis infimis florum sterilium 6–12 lin. longis .... 6. *comosum.*
    Coma racemosa, pedicellis infimis florum sterilium 1–2 lin. longis .... 7. *Pinardi.*
Pedicelli infimi demum 2 poll. longi .... 8. *longipes.*

§ Botryanthus (Kunth). *Perianthium globoso- vel obovoideo-tubuloso-urceolatum, sursum teres vel sulcatum,* 1–2 *vel raro* 3 *lin. longum, segmentis deltoideis plerumque reflexis. Racemus* 1–2 *poll. longus. Coma florum sterilium inconspicua vel subnulla.*

Perianthium obovoideo-tubuloso-urceolatum, sursum sulcatum, duplo longius quam latum.
Flores laxe subspicati. Folia filiformia subteretia. 9. *Gussonii.*
Flores distincte racemosi.
  Folium loratum, solitarium .... 10. *latifolium.*
  Folia plura.
    Racemus laxus; folia planiuscula, 2–4 lin. lata.
      Flores abortivi subnulli .... 11. *Bourgæi.*
      Flores abortivi pauci laxi .... 12. *maritimum.*

Racemus densus; folia lineari-filiformia, profunde canaliculata vel subteretia.
Odori, segmentis limbi deltoideis reflexis.
Folia 5–6 poll. longa, 1–1½ lin. crassa. 13. *racemosum.*
Folia 9–12 poll. longa, 1½–2 lin. crassa. 14. *neglectum.*
Inodorum, segmentis limbi brevissimis haud reflexis.
15. *commutatum.*
Perianthium globoso- vel obovoideo-urceolatum vix sulcatum, haud duplo longius quam latum.
Folia lineari-lorata, plura, planiuscula, 3–6 lin. lata.
Folia 15–18 poll. longa, 5–6 lin. lata .... 16. *grandifolium.*
Folia 6–12 poll. longa, 3–5 lin. lata .... 17. *botryoides.*
Folia 2, lineari-lingulata, 2–3 poll. longa .. 18. *Aucheri.*
Folia plura, lineari-filiformia, semiteretia.
Perianthium vix urceolatum .... 19. *pallens.*
Perianthium distincte urceolatum.
Racemus laxus; perianthium 1½–2 lin. longum.
20. *parviflorum.*
Racemus densus; perianthium 2½–3 lin. longum.
21. *Heldreichii.*

1. **M. MOSCHATUM**, *Willd. Enum.* 378; *Bot. Mag.* t. 734; *Kunth, Enum.* iv. 313.—Hyacinthus Muscari, *Linn. Sp.* 454.—M. ambrosiacum, *Mœnch, Meth.* 633; *Red. Lil.* t. 132. Folia 5–6, carnoso-herbacea, planiuscula, subglauca, lineari-lorata, subpedalia, 6–9 lin. lata. Scapus 4–8-pollicaris. Racemus subdense 20–50-florus, expansus 1–3 poll. longus, 9–10 lin. crassus, floribus omnibus subsessilibus vel infimis brevissime pedicellatis. Perianthium fertile tubuloso-urceolatum, 3½–4 lin. longum, 1½ lin. crassum, flavescenti-viride, segmentis brevissimis carnosis stellatim patentibus. Flores steriles graciliores, cærulei, sessiles vel breviter pedicellati. Capsula 8–9 lin. longa et lata. *Asia minor*, Forbes! *Caucasus*, Ledebour, *Kurdistan*, Olgum!—Botryanthus Saulii, *Jaub. et Spach, Ill. Pl. Orient.* t. 329, est forma minor floribus pedicellatis.

Var. *β*, **FLAVUM**, *Lam. Ency.* iii. 193; *Bot. Mag.* t. 1565.—M. macrocarpum, *Sweet, Flow. Gard.* t. 210; *Parl. Fl. Ital.* ii. 508. Racemus laxior, 2–3 poll. longus, 1 poll. vel ultra crassus, perianthum fertile flavescens, 5–6 lin. longum, magis oblongum, dentibus purpureis. *Sicilia* (*an spontanea?*), *Oriens.*

2. **M. ALPINUM**, *Gay, MS.* Folia 4–5, carnoso-herbacea, linearia, 2–3 poll. longa, 2–3 lin. lata. Scapus 1½–2-pollicaris. Racemus sublaxe 12–20-florus, 12–18 lin. longus, 5–6 lin. crassus, floribus infimis bre-

vissime petiolatis. Perianthium fertile viridescens, tubuloso-urceolatum, 2½ lin. longum. Flores abortivi cærulei, pedicellis 2–3 lin. longis. *Cilicia*; *Taurus, in regione alpina,* Balansa, 151.

3. M. Cupanianum, *Gerb. et Tarant. Cat.* 18; *Guss. Fl. Sic.* ii. 814; —Leopoldia, *Parl. Fl. Ital.* ii. 497. Folia late linearia, flaccida, canaliculata, scapo longiora. Racemus elongatus, densiusculus, floribus fertilibus laxiusculis, subsessilibus, superioribus abortivis sessilibus, omnibus erectis, subadpressis. *Sicilia* (non vidi).

4. M. caucasicum, *Baker.*—Bellevallia caucasica, *Griseb. Fl. Rumel.* ii. 387.—M. pallens, *Hohen. Exsic. non Besser.*—M. tubiflorum, *Stev. Taur.* 336? Folia 2–4, carnoso-herbacea, lineari-lorata, 6–9 poll. longa, 4–6 lin. lata, falcata. Scapus 6–8-pollicaris. Racemus laxe 20–40-florus, floriferus expansus 3–4 poll. longus, 1 poll. latus. Pedicelli floriferi infimi subpatentes, 1½–3 lin. longi. Perianthium fertile obovoideo-urceolatum, livido-cæruleum, 3 lin. longum. Flores abortivi multi, parvi, conferti, breviter pedicellati. *Georgia caucasica in montosis aridis ditionis Elisabethpol,* Hohenacker!

5. M. bootanense, *Griff. Ic.* t. 280. Folia 5–6, carnoso-herbacea, linearia, dorso valde convexa, 5–6 poll. longa, 3–4 lin. lata. Scapus 5–6-pollicaris. Racemus 12–20-florus, expansus 2–2½ poll. longus, 12–15 lin. latus. Pedicelli fructiferi patentes, 3–4 lin. longi. Perianthium oblongo-urceolatum, 4–4½ lin. longum, 2 lin. crassum. Flores steriles pauci, breviter petiolati, decidui. *Bootan,* Griffith.

6. M. comosum, *Mill. Dict.* No. 2; *Red. Lil.* t. 231; *Koch, Synops.* 834; *Gren. Fl. Franc.* iii. 219; *Ledeb. Fl. Ross.* iv. 153.—Bellevallia comosa, *Kunth, Enum.* iv. 306.—Hyacinthus comosus, *Linn. Sp.* 455; *Red. Lil.* t. 231; *Bot. Mag.* t. 133.—Leopoldia comosa, *Parlat. Fl. Palerm.* i. 438. Folia 3–4, carnoso-herbacea, pallide viridia, lineari-lorata, 12–18 poll. longa, 6–12 lin. lata, e medio utrinque sensim angustata. Scapus pedalis vel ultra, fusco-maculatus. Racemus laxe 40–100-florus, floriferus expansus 6–12 poll. longus, 15–18 lin. latus. Pedicelli infimi horizontales, demum 3–5 lin. longi. Perianthium fertile obovoideo-urceolatum, olivaceo-amethystinum, 3–4 lin. longum, sursum 1½–2 lin. latum. Flores steriles cærulei, 20–30, corymbosi, pedicellis elongatis arcuatis coloratis, infimis 6–12 lin. longis. Capsula 3–4 lin. longa et lata, haud emarginata. *Ex insulis Fortunatis,* Bourgeau 1004! Mann! *et Algeria per Europam meridionalem ad Tauriam,* Pallas! *et Euphratem,* Chesney 162!—Hyacinthus monstrosus, *Linn. Sp.* 454 (H. paniculatus, *Lam. Encyc.* iii. 193.—Muscari monstrosum, *Mill. Dict.* No. 4) est monstrositas sæpe in hortis culta racemo ramosissimo floribus lilacinis exiguis omnibus abortivis profunde partitis.—M. Courtilleri, *Boreau, Fl. Centre,* edit. 3, ii. 621, est

varietas gracilis foliis magis serotinis primum cylindricis floribus brevioribus sterilibus laxioribus.—Leopoldia Calandriniana, *Parl. Fl. Ital.* ii. 496, est varietas gracilis floribus densioribus abortivis magis approximatis.—M. tenuiflorum, *Tausch, Flora,* 1841, p. 234 (M. comosum, *Jacq. Austr.* t. 126) est forma foliis angustioribus floribus abortivis angustioribus pedicellis brevioribus.—M. Clusianum, *C. Koch, Linnæa,* xxii. 253 (*Led. Ross.* iv. 154; Bellevallia, *Griseb. Spic. Rumel.* ii. 387) est verisimiliter varietas floribus abortivis paucioribus confertioribus.

7. M. PINARDI, *Boiss. Diagn.* vii. 110.—Bellevallia Pinnardi, *Boiss. Diagn.* v. 62.—Leopoldia Pinardi, *Parl. Fl. Palerm.* i. 440. Folia 4–6, carnoso-herbacea, linearia, 6–9 poll. longa, 3–4 lin. lata. Scapus 6–8-pollicaris. Racemus laxe 50–80-florus, floriferus expansus 4–8 poll. longus, 1 poll. latus. Pedicelli infimi fructiferi horizontales, 2 lin. longi. Perianthium fertile cylindraceo-urceolatum, 3½–4 lin. longum, sursum vix 1½ lin. crassum. Flores steriles 12–20, haud corymbosi, pedicellis inferiorum 1–2 lin. longis. Capsula globosa. *Caria,* Pinard! *Cappadocia,* Balansa 1114!

8. M. LONGIPES, *Boiss. Diagn.* xii.; *Walpers, Ann.* vi. 113. Folia lineari-lorata, 4–11 lin. lata, scabrido-denticulata, scapo breviora. Perianthium saturate cæruleum, 3½–4 lin. longum. Flores steriles pauci, brevissime petiolati. Racemus fructiferus pyramidalis, pedicellis infimis sæpe 2 poll. longis. Capsula oblonga. *Philistia,* Boissier (non vidi). Habitu ad *Hyacin. ciliatum* accedit, sed floribus generis.

9. M. GUSSONII, *Baker.*—Leopoldia Gussonii, *Parlatore, Fl. Ital.* ii. 498.—Muscari maritimum, *Guss. Fl. Sic.* 426, *non Desf.* Folia 3–4, lineari-filiformia, subteretia, 5–6 poll. longa. Scapus 3–4-pollicaris. Racemus sublaxe 20–30-florus, demum 2–2½ poll. longus, 6 lin. latus. Pedicelli nulli vel brevissimi. Perianthium obovoideo-urceolatum, 2 lin. longum. Flores abortivi pauci, sessiles, decidui. *Sicilia,* E. & A. Huet du Pavillon 263!

10. M. LATIFOLIUM, *Kirk, Edin. New Phil. Journ.* April 1858.—Bellevallia monophylla, *Gay in Balansa, Pl. Orient. Exsic.* 1857.—B. muscarioides, *Masters, Linn. Journ.* iii. 113.—Folium semper solitarium, lorātum, carnoso-herbaceum, 9–12 poll. longum, 9–12 lin. latum, cite acutum, infra medium ad basin angustam sensim angustatum. Scapus gracilis, pedalis vel ultra. Racemus modice densus, 20–30-florus, floriferus expansus 1½–2 poll. longus, 9–10 lin. latus. Pedicelli infimi fructiferi 2–2½ lin. longi, horizontales vel leviter deflexi. Perianthium fertile obovoideo-urceolatum, 2½ lin. longum, ore 1 lin. crassum. Flores abortivi 6–10 multo pallidiores, sublaxi, superiores sessiles, infimi breviter petiolati. Capsula globosa, 4

lin. longa, apice emarginata. *Phrygia, ad montem Mourad-Dagh, in pinetis,* Balansa! *Mysia, Mt. Ida,* Dr. Armitage!

11. M. Bourgæi, *Baker.* Folia 3–4, carnoso-herbacea, falcata, lineari-lingulata, 2–3 poll. longa, 2–3 lin. lata, dimidio inferiore sensim angustata. Scapus 1½–2-pollicaris. Racemus sublaxe 6–10-florus, expansus 6–9 lin. longus, 6–7 lin. latus. Pedicelli infimi 1 lin. longi, patentes vel leviter ascendentes. Perianthium saturate cæruleum, oblongo-tubuloso-urceolatum, 2 lin. longum, dentibus brevissimis. Flores abortivi subnulli. *Lycia, ad nives deliquescentes montis Akdagh,* Bourgeau 262!

12. M. maritimum, *Desf. Atl.* i. 308, *non Guss.*—Bellevallia maritima, *Kunth, Enum.* iv. 307, *ex parte.*—Leopoldia maritima, *Parl. Fl. Ital.* ii. 498. Folia 3–4, carnoso-herbacea, linearia, 6–9 poll. longa, 3–4 lin. lata. Scapus 3–6-pollicaris. Racemus laxe 12–20-florus, demum 2–2½ poll. longus, 7–8 lin. latus. Pedicelli infimi 1 lin. longi, plus minus ascendentes. Perianthium obovoideo-urceolatum, 2½ lin. longum. Flores superiores steriles pauci, distincte pedicellati. *Algeria,* Bove! Balansa 167! *Creta, in arenosis maritimis,* Von Heldreich!

13. M. racemosum, *Mill. Dict.* No. 3; *Red. Lil.* t. 232; *DC. Fl. Franc.* iii. 208; *Boreau, Fl. Cent.* 3rd edit. ii. 620; *Eng. Bot.* edit. iii. t. 1529.—Hyacinthus racemosus, *Linn. Sp.* 455; *Jacq. Austr.* t. 187; *Bot. Mag.* t. 122.—H. juncifolius, *Lam. Encyc.* iii. 194.—Botryanthus odorus, *Kunth, Enum.* iv. 311; *Parl. Ital.* ii. Folia 5–6, junciformia, viridia, semiteretia, 5-6 poll. longa, 1–1½ lin. crassa. Scapus 4–6-pollicaris. Racemus dense 12–30-florus, expansus vix ultra 1 poll. longus, 8–9 lin. latus. Pedicelli 1–1½ lin. longi, inferiores cernui. Flores odori. Perianthium saturate cæruleum, oblongo-tubuloso-urceolatum, 2-2½ lin. longum, superne leviter sulcatum, dentibus albidis deltoideis reflexis. Flores abortivi pauci, pallidiores, breviter petiolati. Capsula 3–3½ lin. longa, apice haud emarginata. *Ex Anglia et Lusitania per Europam meridionalem et centralem ad Afghanistan,* Griffith 357! 441! *Kurdistan,* Olgum! *Persiam,* Stocks! —M. pulchellum, *Held. et Sart. in Boiss. Diagn.* ser. 2, iv. 109; *Regel. Gartenfl.* t. 377, e Parnasso, dicitur differre foliis minus junciformibus, perianthii dentibus majoribus magis revolutis, M. Strangwaysii, *Ten. Ind. Sem. Hort. Petr.* 1837, p. 5 (Botryanthus, *Kunth, Enum.* iv. 679).—*Byzantium,* racemo laxo paucifloro et foliis erectis. M. atlanticum, *Boiss. et Reut. Pug.* 114, *Willk. et Lange, Fl. Hisp.* i. 206, *Hispania et Algeria,* ex exemplis authenticatis exsiccatis non potui distinguere.

14. M. neglectum, *Gussone, Fl. Sic.* i. 411; *Gren. Fl. France,* iii. 218; *Boreau, Fl. Cent.* 3rd edit. ii. 621.—Botryanthus neglectus, *Kunth, Enum.* iv. 679; *Parl. Fl. Ital.* ii. 502. Folia plura, carnoso-herbacea,

9–12 poll. longa, lineari-filiformia, profunde canaliculata, 1½–2 lin. crassa. Scapus 6–9-pollicaris. Racemus dense 30–40-florus, expansus 1½–2 poll. longus, 9–10 lin. latus. Pedicelli 1–1½ lin. longi, inferiores cernui. Flores odori. Perianthium saturate cæruleum, 2½–3 lin. longum, obovoideo-tubuloso-urceolatum, leviter sulcatum, dentibus albidis deltoideis reflexis. Flores abortivi pauci, breviter petiolati. Capsula 4 lin. longa et paulo latior. *Gallia, Germania, Italia.* Vix aliud quam var. major præcedentis.

15. M. COMMUTATUM, *Guss. Prodr. Fl. Sic.* i. 426; *Sweet, Flow. Gard.* ser. ii. t. 369.—Hyacinthus commutatus, *Ten. Syll.* 176.—Botryanthus commutatus, *Kunth, Enum.* iv. 311; *Parl. Fl. Ital.* ii. 503. Folia 5–6, carnoso-herbacea, anguste linearia, canaliculata, flaccida, viridia, 5–6 poll. longa, 1½–2 lin. lata. Scapus 4–6-pollicaris. Racemus dense 12–20-florus, expansus 9–12 lin. longus, 6–7 lin. latus. Pedicelli infimi 1 lin. longi, deflexi. Flores subinodori. Perianthium saturate cæruleum, 2½ lin. longum, tubuloso-turbinato-urceolatum, sursum distincte sulcatum, dentibus brevissimis vix recurvatis. Flores abortivi subnulli. *Hispania,* Lange! *Italia,* Tenore! *Sicilia,* Jan! Parlatore! Tineo! *Græcia,* Zuccarini! Von Heldreich! Palestina, *Roth*! *Armenia,* Huet du Pavillon! (albiflora ut "M. Aucheri"). *In montibus Kassan Oghlu,* Kotschy, 'Iter Cilicico-Kurdicum,' 73! ("M. Strangwaisii").—M. Lafarinæ, *Tineo in Huet. du Pavillon, Pl. Sicil. Exsic.*, vix differt.—Botryanthus albo-virens, *Todaro, Ann. Sc. Nat.* ser. iv. xx. 304, est verisimiliter forma albiflora.

16. M. GRANDIFOLIUM, *Baker in Saund. Ref. Bot.* t. 173. Folia 5–6, carnoso-herbacea, glaucescentia, 15–18 poll. longa, 5–6 lin. lata, lineari-lorata, flaccida. Scapus 5–6-pollicaris. Racemus dense 15–20-florus, expansus 15–18 lin. longus, 7–8 lin. latus. Pedicelli infimi cernui, 1–1½ lin. longi. Perianthium oblongo-urceolatum, livide cæruleum, haud sulcatum, 3 lin. longum, 2 lin. crassum, segmentis deltoideis albidis reflexis. Flores superiores pauci, subsessiles, abortivi. Capsula 4 lin. longa. *Patria ignota: v. v. in Hort. Kew.*

17. M. BOTRYOIDES, *Mill. Dict.* No. 1; *Red. Lil.* t. 361; *Sweet, Flow. Gard.* t. 15.—Hyacinthus botryoides, *Linn. Sp.* 455; *Bot. Mag.* t. 157.—Botryanthus vulgaris, *Kunth, Enum.* iv. 311; *Parl. Fl. Ital.* ii. 499.—M. transilvanicum, *Schur, Transyl.* 676. Folia 3–4, carnoso-herbacea, lineari-lorata, flaccida, subglauca, 6–12 poll. longa, 3–4 lin. lata, planiuscula, deorsum angustata. Scapus 6–9-pollicaris. Racemus dense 12–20-florus, expansus 12–18 lin. longus, 6 lin. latus. Pedicelli infimi deflexi, 1 lin. longi, floribus cernuis. Perianthium globoso- vel oblongo-urceolatum, 1–1½ lin. longum, pallide cæruleum, haud sulcatum, inodorum. Flores abortivi 6–9, sessiles vel breviter pedicellati. Capsula globosa, 3–4 lin. longa. *A Lusitania et Sicilia ad Bosniam et Germaniam et Galliam septentrionalem*

Var. β. Lelievrii, *Baker.*—M. Lelievrii, *Boreau, Flor. Cent.* edit. 3, ii. 621; *Gren. Fl. France,* iii. 219. Racemus densior, expansus 7–8 lin. latus. Perianthium crassior, $1\frac{1}{2}$–2 lin. longum. Pedicelli inferiores minus deflexi. Floratio præcocior (ad finem Februarii in loco natali). *Gallia occidentalis,* Boreau!

18. M. Aucheri, *Baker.*—Botryanthus Aucheri, *Boiss. Diagn.* v. 63. Folia 2, carnoso-herbacea, lineari-lingulata, 2–3 poll. longa, sursum 2–3 lin. lata, dimidio inferiore sensim angustata. Scapus gracilis, 2–4-pollicaris. Flores 6–10, dense subspicati, inferiores brevissime pedicellati. Perianthium turbinato-urceolatum, vix 1 lin. longum. *Asia Minor, Nikisar,* Aucher Eloy, 5399!

19. M. pallens, *Fisch. Cat. Gorenk.* 1812, 9; *Sweet, Flow. Gard.* t. 259; *Steven, Taur.* 337, *non Besser.*—Hyacinthus pallens, *M. Bieb. Fl. Taur. Cauc.* i. 283. Folia plura, filiformia, semiteretia, 6–8 poll. longa, 1 lin. lata, facie glauca, dorso rotundata, viridia. Scapus 3–5-pollicaris. Racemus dense 12–20-florus, expansus 8–10 lin. longus, 6–7 lin. latus. Pedicelli infimi vix 1 lin. longi. Perianthium oblongum, minus urceolatum quam in speciebus reliquis, album, 2 lin. longum, $1\frac{1}{2}$ lin. latum, dentibus lanceolato-deltoideis recurvatis. Flores abortivi 3–4, subsessiles. *Caucasus et Iberia* (*v. v. in Hort. Kew.*).

20. M. parviflorum, *Desf. Atl.* i. 309; *Guss. Prodr.* i. 427; *Bert. Fl. Ital.* iv. 167.—Hyacinthus parviflorus, *Pers. Syn.* i. 375.—Botryanthus parviflorus, *Kunth, Enum.* iv. 312. *Parl. Fl. Ital.* ii. 505.—Muscari filifolium, *Wahl. Isis,* xxi. fasc. x. 971. Folia 6–8, lineari-filiformia, flaccida, subteretia, 4–5 poll. longa, 1 lin. lata, basi angustata. Scapus filiformis, flexuosus, 4–8-pollicaris. Racemus laxe 6–12-florus, demum 9–15 lin. longus, 8–9 lin. latus. Pedicelli infimi fructiferi, patentes, $1\frac{1}{2}$–2 lin. longi. Perianthium pallide cæruleum, oblongo- vel ovoideo-urceolatum, 1 2 lin. longum. Flores abortivi pauci, congesti, sessiles, decidui. *Ex Hispania,* Rambur! *Algeria et Sicilia,* Gussone! Tineo! Parlatore! *ad Ægyptum, teste* Schweinfurth, *et Syriam,* C. Martens! Hooker et Hanbury!

21. M. Heldreichii, *Boiss. Diagn.* ser. 2, iv. 109; *Baker in Saund. Ref. Bot.* t. 172.—M. hymenophorum, *Held. Herb. Norm. Græc.* 662. Folia 5–6, junciformia, erecto-falcata, viridia, semiteretia, 8–12 poll. longa, $1\frac{1}{2}$ lin. crassa. Scapus flexuosus, 4–6-pollicaris. Racemus subdense 8–12-florus, expansus 12–15 lin. longus, 10–12 lin. latus. Pedicelli infimi patentes, 1 lin. longi. Perianthium obovoideo-urceolatum, amethystinum, ore leviter constrictum, $2\frac{1}{2}$–3 lin. longum, dentibus albis recurvatis. Flores abortivi, pauci, subsessiles. *Græcia, Parnassus,* Von Heldreich! (*v. v. in Hort. Kew.*).

20. LITANTHUS, *Harv.*

Harv. Hook. Journ. 1844, p. 315, t. 9; *Cape Gen.* 2 edit. 399.

Perianthium minutum, tubulosum, segmentis ovato-deltoideis æqualibus erectis tubo cylindrico fundo demum ventricoso 6–8-plo brevioribus. *Stamina* ad faucem tubi uniseriata, filamentis brevissimis filiformibus, antheris sagittatis versatilibus. *Ovarium* ovoideum, sessile, leviter trisulcatum, ovulis in loculis pluribus; *stylus* rectus, filiformis, ad faucem attingens; *stigma* trisulcatum. *Capsula* ignota. *Herba bulbosa, perpusilla, foliis filiformibus synanthiis, scapo unifloro bracteis duabus oppositis medio affixis.*

1. L. PUSILLUS, *Harv. loc. cit.* Bulbus membranaceo-tunicatus, 2–3 lin. crassus. Folia 2–3, setacea, 6–12 lin. longa. Scapus filiformis, 9–18 lin. longus. Perianthium albo-viride, membranaceum, 2 lin. longum, ½ lin. crassum. *Cap. B. Spei,* Drège, 8514*a*! Zeyher; *Kaffraria britannica in graminosis inundatis,* H. Bowker and Mrs. Barber, 767!

21. DRIMIA, *Jacq.*

Jacq. Ic. t. 373–377; *Endl. Gen.* 1125; *Salisb. Gen.* 37; *Baker in Saund. Ref. Bot.* iii. *App.* 2, *non Kunth nec Harvey.*—Idothea, *Kunth, Enum.* iv. 341; *Harv. Cap. Gen.* 2nd edit. 397.

Perianthium companulato-gamophyllum, segmentis ligulatis cucullatis æqualibus mox irregulariter reflexis tubo 2–3-plo excedentibus. *Stamina* ex fauce tubi subuniseriata, filamentis elongatis, deorsum complanatis, segmentis subæquantibus, interdum leviter declinatis, antheris oblongis versatilibus. *Ovarium* sessile, ovoideum, ovulis in loculis pluribus (6–20); *stylus* filiformis, interdum leviter declinatus; *stigma* capitatum. *Capsula* sessilis, ovoidea, membranacea, profunde trisulcata, loculicide trivalvis, seminibus in loculis paucis vel pluribus discoideis uniseriatis. *Testa* nigra. *Herbæ bulbosæ, floribus numerosis racemosis, foliis synanthiis vel hysteranthiis.*

Species capenses, foliis synanthiis.
  Folia dura, angustissima.
    Bracteæ 1–1½ lin. longæ .... 1. *media.*
    Bracteæ 3–4 lin. longæ .... 2. *rigidifolia.*
  Folia lorata carnoso-herbacea.
    Racemus 9–12 lin. latus; pedicelli 2–3 lin. longi.
      3. *Burchellii.*

Racemus 2½ poll. latus; pedicelli 6–8 lin. longi. 4. *robusta.*
Racemus 3 poll. latus; pedicelli 9–12 lin. longi. 5. *altissima.*
Species capenses, foliis hysteranthiis.
Folia dura angustissima .... 6. *purpurascens.*
Folia linearia ciliata, 3–4 lin. lata.
Pedicelli subpatentes, 3–4 lin. longi .... 7. *ciliaris.*
Pedicelli erecto-patentes, 1–1½ lin. longi.. 8. *pusilla.*
Folia lorato-lanceolata, 6–9 lin. lata.
Folia undique villosa .... 9. *villosa.*
Folia glabra.
Racemus 2 poll. latus .... 10. *elata.*
Racemus 3 poll. latus .... 11. *concolor.*
Species tropicales, foliis ignotis, verisimiliter hysteranthiis.
Perianthium 4–4½ lin. longum, segmentis margine convolutis. 12. *laxiflora.*
Perianthium 2 lin. longum, segmentis lanceolato-spathulatis, complanatis .... 13. *Barteri.*

1. D. MEDIA, *Jacq. Ic.* t. 375; *Willd. Sp.* ii. 166; *Roem. et Schult. Syst.* vii. 596.—Hyacinthus, *Poir. Encyc. Suppl.* iii. 120.—Idothea, *Kunth, Enum.* iv. 342. Bulbus ovoideus, membranaceo-tunicatus, 18–24 lin. crassus. Folia plura, synanthia, dura, nervosa, pedalia vel ultra, subtriquetra, 1–1½ lin. lata, margine scabrida. Scapus gracilis, fragilis, 1½–2-pedalis. Racemus 20–60-florus, 2–5 poll. longus, expansus 16–18 lin. latus. Pedicelli erecto-patentes vel subpatentes, 3–5 lin. longi. Bracteæ lanceolatæ, pedicellis 3–4-plo breviores. Perianthium 6 lin. longum, segmentis tubum 3–4-plo excedentibus. *Cap. B. Spei,* Drège, 1496! Burchell, 4593! 8322! Zeyher, 4250! Harvey! &c.

2. D. RIGIDIFOLIA, *Baker.* Folia plura, synanthia, dura, nervosa, sesquipedalia, subtriquetra, deorsum 1½–2 lin. lata. Scapus ultrapedalis. Racemus 4–6 poll. longus, modice densus, 30–40-florus, expansus 2 poll. latus. Pedicelli stricti, patentes, 5–6 lin. longi. Bracteæ lineari-acuminatæ, 3–4 lin. longæ. Perianthium 7–7½ lin. longum, segmentis tubo 3–4-plo excedentibus. *Cap. B. Spei,* Harvey ex hort. Baronis Ludwigii! *Somerset,* Bowker, 225! Ad præcedentem affinis.

3. D. BURCHELLII, *Baker in Saund. Ref. Bot.* ii. *App.* 2. Folia 3–4, synanthia, carnoso-herbacea, lorato-lanceolata, in exemplis nostris 7–8 poll. longa, deorsum 12–14 lin. lata, acuta. Scapus 3–4 lin. crassus, pedalis vel ultra. Racemus 8–9 poll. longus, 9–12 lin.

latus, modice densus. Pedicelli erecto-patentes, 2–3 lin. longi, bracteis subæquantes. Perianthium 5–6 lin. longum, segmentis tubo 3–4-plo excedentibus. Capsula 4½ lin. longa, seminibus in loculo circiter 3. *Cap. B. Spei*, Burchell, 4769! Zeyher, 954!

4. D. ROBUSTA, *Baker in Saund. Ref. Bot.* t. 190. Bulbus ovoideus, 3–4 poll. crassus. Folia 6–8, synanthia, carnoso-herbacea, viridia, lorata, 2 pedes longa, 2 poll. lata. Scapus firmus, tripedalis, deorsum 8–9 lin. crassus. Racemus modice densus, 8–12 poll. longus, expansus 2½ poll. latus. Pedicelli 6–8 lin. longi, subpatentes, pedicellis linearibus subæquantes. Perianthium 7–8 lin. longum, segmentis tubum 3–4-plo superantibus. Stamina distincte declinata, segmentis paulo breviora. *Cap. B. Spei, v. v. in Hort. Saundersii.*

5. D. ALTISSIMA, *Hook. Bot. Mag.* 5522, *non Gawl. Bot. Mag.* 1074, *quæ est* Urgineæ *species.* Bulbus ovoideus, 3–4 poll. crassus, triente superiore emerso squamoso. Folia 8–10, synanthia, carnoso-herbacea, lorata, 12–18 poll. longa, 18–24 lin. lata, acuta, subglauca. Scapus firmus, 3–4-pedalis. Racemus modice densus, 8–12 poll. longus, expansus 3 poll. latus. Pedicelli 9–12 lin. longi, subpatentes vel leviter deflexi. Bracteæ lineares, pedicellis subæquantes. Perianthium 9–10 lin. longum, laciniis tubum quadruplo superantibus. Stamina distincte declinata, 4–4½ lin. longa. *Cap. B. Spei, v. s. ex hort. Saundersii.*

6. D. PURPURASCENS, *Jacq. fil. Eclog.* t. 30; *Roem. et Schult. Syst.* vii. 598.—Idothea purpurascens, *Kunth, Enum.* iv. 342. Bulbus tunicatus. Folia 9–10, hysteranthia (post racemum producta) anguste linearia, semipedalia, 2 lin. lata, glaucescentia, subscariosa. Scapus subpedalis. Racemus circiter 30-florus. Pedicelli patentes, perianthiis æquantes, bracteis lineari-lanceolatis duplo longiores. *Cap. B. Spei (non vidi).*

7. D. CILIARIS, *Jacq. Ic.* t. 377; *Willd. Sp.* ii. 165; *Bot. Mag.* t. 1444.—Hyacinthus, *Poir. Encyc. Suppl.* iii. 120.—Idothea, *Kunth, Enum.* iv. 343. Bulbus globosus, 2–3 poll. crassus, dimidio superiore emerso squamoso. Folia post scapum, 4–5, linearia, ciliata, 6–8 poll. longa, 3–4 lin. lata, pruinata. Scapus sesquipedalis. Racemus laxe 20–25-florus, 8–10 poll. longus, expansus 2 poll. latus. Pedicelli subpatentes, 3-4 lin. longi. Bracteæ minutæ, lanceolatæ. Perianthium 8–9 lin. longum, segmentis tubo triplo longioribus. *Cap. B. Spei.*

8. D. PUSILLA, *Jacq. Ic.* t. 374; *Willd. Sp.* ii. 165; *Roem. et Schult. Syst.* vii. 598.—Hyacinthus, *Poir. Encyc. Suppl.* iii. 120.—Idothea, *Kunth, Enum.* iv. 344.—I. humilis, *Kunth, loc. cit.*? Bulbus subglobosus, sursum squamosus. Folia post scapum, 4–6, linearia, 3–4 poll. longa, 3–4 lin. lata, glauca, ciliata. Scapus 2–3-pollicaris.

Racemus 1–1½ poll. longus, expansus 1 poll. latus, 10–20-florus. Pedicelli erecto-patentes, 1–1½ lin. longi. Bracteæ deltoideæ, 1 lin. longæ. Perianthium 6–7 lin. longum, segmentis tubum triplo excedentibus. Stamina segmentis paulo breviora. *Cap. B. Spei*, Sir J. Banks!

Var. β. SETOSA, *Baker*. Perianthium 4–4½ lin. longum. Scapus setis albidis dense vestitus. Folia non vidi. *Cap. B. Spei*, Ecklon et Zeyher, Asphod. 28!

9. D. VILLOSA, *Lindl. Bot. Reg.* t. 1346.—Idothea villosa, *Kunth, Enum.* iv. 343. Folia hysteranthia, post scapum, lorata, 6–8 poll. longa, 8–9 lin. lata, acuta, glauca, valde undulata, undique villosa. Racemus modice densus, 4–5 poll. longus, expansus 2 poll. latus. Pedicelli floriferi patentes, 6–7 lin. longi. Bracteæ lineari-lanceolatæ, 2–3 lin. longæ. Perianthium 7–8 lin. longum, segmentis tubo 3–4-plo longioribus. Stamina distincte declinata. *Cap. B. Spei* (*non vidi*).

10. D. ELATA, *Jacq. Ic.* t. 373; *Willd. Sp.* ii. 165; *Red. Lil.* t. 430; *Bot. Mag.* t. 822.—Hyacinthus, *Poir. Encyc. Suppl.* iii. 120.—Idothea elata, *Kunth, Enum.* iv. 343. Bulbus subrotundus, magnitudine pugni, squamosus. Folia hysteranthia (post scapum) lineari-lanceolata, glabra, pedalia vel ultra, 6–9 lin. lata. Scapus 1½–2-pedalis. Racemus modice densus, 30–100-florus, 6–12 poll. longus, 2 poll. latus. Pedicelli ascendentes, 5–6 lin. longi. Bracteæ lineares 3–4 lin. longi. Perianthium 7–8 lin. longum, segmentis tubo 3–4-plo longioribus. Stamina leviter declinata. *Cap. B. Spei*, Sir J. Banks! Zeyher, 1713! Burke! *Natal*, Sanderson, 464!

Var. β, COOPERI, *Baker*. Folia ignota. Scapus tripedalis. Flores racemi multo pauciores et laxiores, pedicellis erecto-patentibus inferioribus 12–15 lin. longis. Perianthium 6 lin. longum. *Kaffraria britannica*, Cooper, 387! Verisimiliter species distincta.

11. D. CONCOLOR, *Baker*. Bulbus 3 poll. crassus, sursum squamosus. Folia post scapum, anguste lanceolata, glabra, acuta (in statu juniore solum vidi). Scapus 2½-pedalis. Racemus modice densus, 18 poll. longus, expansus 3 poll. crassus. Pedicelli floriferi subpatentes, 4–6 lin. longi, bracteis linearibus subæquantes. Perianthium viride, 8–9 lin. longum, segmentis tubo 2–3-plo longioribus. Stamina declinata. *Cap. B. Spei* (*e tab. ex exemplo in Hort. Kew. anno* 1823 *culto depicta descripta*).

12. D. LAXIFLORA, *Baker*. Folia non vidi. Scapus 15–18-pollicaris, gracilis. Racemus 6–8 poll. longus, 15–18 lin. latus (deorsum laxissime), 10–15-florus. Pedicelli ascendentes, infimi 5–6 lin. longi. Bracteæ minutæ, lineares. Perianthium 4–4½ lin. longum, segmentis

tubum 2–3-plo excedentibus. Filamenta $2\frac{1}{2}$ lin. longa, cum stylo leviter declinata. *Zambesi-land prope Quillimane*, Dr. Kirk!

13. D. Barteri, *Baker*. Folia non vidi. Scapus 15–18-pollicaris, gracilis. Racemus laxus, ultra 2 pedes longus, 18–21 lin. latus. Pedicelli stricti, horizontales, 6–8 lin. longi. Bracteæ perminutæ, deltoideæ. Perianthium tubuloso-campanulatum, segmentis erectis lanceolato-spathulatis tubum duplo excedentibus. Filamenta complanata, segmentis subduplo breviora. Capsula 5 lin. lata, 3 lin. longa, seminibus in loculo 8–9. *Guinea; in ditione nigritana prope Nupe*, Barter, 1183! Ab speciebus reliquis recedit floribus multo minoribus, segmentis complanatis, staminibus segmentis duplo brevioribus.

22. Hyacinthus, *Linn.*

Linn. Gen. 1427, *ex parte*; *Endl. Gen.* 1120; *Kunth, Enum.* iv. 303.—Bellevallia, *Lapeyr. Journ. Phys.* 67, 425, t. 1; *Endl. Gen.* 1119; *Kunth, Enum.* iv. 306.—Peribœa, *Kunth, Enum.* iv. 293; *Harv. Cap. Gen.* 2nd edit. 394.—Strangweia, *Bertol. Mem. Soc. Ital.* t. xxi.—Foxia, *Parlat. Nuov. Gen*, 18.—Busbequia, *Salisb. Gen.* 25.—Hyacinthella, *Schur, Oest. bot. Wochenbl.* 1856, 227.

Perianthium tubuloso-gamophyllum, ore nullo modo constrictum, segmentis lanceolatis complanatis falcatis vel subrectis tubo æquantibus vel brevioribus. *Stamina* uniseriata vel plus minus distincte biseriata, in tubo vel ad faucem inserta, filamentis plerisque filiformibus raro cuneatis, antheris oblongis vel linearibus versatilibus. *Ovarium* sessile, ovoideum, ovulis in loculis paucis vel pluribus; *stylus* erectus, filiformis; *stigma* capitatum. *Capsula* membranacea, loculicide trivalvis, sessilis, oblonga vel rotundata, obtuse vel acute trigona, seminibus rotundatis vel triquetris numerosis vel paucis. *Testa* nigra. *Herbæ bulbosæ, bulbis semper membranaceo-tunicatis, foliis semper synanthiis, floribus racemosis vel subspicatis, bracteis sæpissime minutis.*

§ Euhyacinthus. *Segmenta tubo subæquantia, vel excedentia, flore expanso falcata vel suberecta. Capsula magna, obtuse trigona, seminibus in loculo* 6–30. *Stamina insertione varia.*

Elatæ, foliis loratis bipedalibus.

Segmenta erecto-patentia, tubo duplo longiora, filamentis longiora . . . . 1. *candicans.*

Segmenta patula, tubo subæquantia, filamentis breviora. 2. *princeps.*

Mediocris, foliis 8–12 poll. longis, 4–6 lin. latis, segmentis limbi patentibus . . . . 3. *orientalis.*
Parvæ, foliis 2–4 poll. longis, 1 lin. latis, segmentis limbi erecto-patentibus.
Racemus confertus, pedicellis erecto-patentibus. 4. *corymbosus.*
Racemus laxus, pedicellis cernuis . . . . . . 5. *brevifolius.*

§ Hyacinthella (Schur., extens.). *Segmenta tubo 2–3-plo breviora, flore expanso suberecta. Loculi ovarii 2–4-ovulati. Capsula parva, obtuse trigona. Stamina in tubo inserta.*

Stamina subsessilia.
Bracteæ 4–6 lin. longæ. Perianthium 4–5 lin. longum, segmentis ovatis . . . . 6. *amethystinus.*
Bracteæ minutissimæ. Perianthium 2–2½ lin. longum, segmentis lanceolatis cucullatis . . . . 7. *ledebourioides.*
Filamenta distincte obvia.
Stamina prope basin tubi inserta . . . . . . 8. *azureus.*
Stamina prope medium tubi biseriata. . . . 9. *pseudo-muscari.*
Stamina supra medium tubi subuniseriata.
Folia coriacea, 1½–2 lin. lata, lineato-nervosa. 10. *leucophæus.*
Folia coriaceo-herbacea, 2–3 lin. lata, vix lineato-nervosa. 11. *dalmaticus.*

§ Strangweia (Parlat.). *Segmenta tubum paulo excedentia, flore expanso falcata. Stamina ex fauce tubi, uniseriata, filamentis brevibus cuneatis bifidis, basi breviter connatis. Semina in loculo* 5–6.

Species sola . . . . 12. *spicatus.*

§ Bellevallia (Lapeyr.). *Segmenta tubo sæpissime 2–3-plo breviora, raro subæquantia, flore expanso suberecta, filamentis brevibus ex fauce uniseriatis. Loculi 2–4-ovulati. Capsula parva, globosa, obtuse trigona, vel major acute trigona. Semina in loculo* 1–2.

Folia rigide coriacea, venis primariis distincte exsculptis.
Flores spicati . . . . 13. *sessiliflorus.*
Flores racemosi.
Folia margine primum minute ciliata . . 14. *lineatus.*
Folia margine diutine distincte ciliata. 15. *hispidus.*
Folia carnoso-herbacea, filiformia, subteretia. 16. *fastigiatus.*
Folia carnoso-herbacea, planiuscula, linearia vel lorata.

Pedicelli infimi capsulis subæquantes vel breviores.
Minores; perianthium 1–2½ lin. longum.
Flores dense spicati .... 17. *micranthus.*
Flores dense subspicati .... 18. *nivalis.*
Flores laxe racemosi .... 19. *pycnanthus.*
Majores; perianthium 4–7 lin. longum.
Segmenta tubo subæquantia .... 20. *romanus.*
Segmenta tubo 2–4-plo breviora.
Perianthium 6–7 lin. longum.
Racemus laxus; segmenta tubo 3–4-plo breviora.
21. *trifoliatus.*
Racemus densus; segmenta tubo duplo breviora.
22. *Aucheri.*
Perianthium 3½–5 lin. longum.
Folia 2–3 lin. lata; racemus expansus densus.
23. *densiflorus.*
Folia 3–6 lin. lata; racemus expansus laxus.
Folia margine ciliata; perianthium viridescens.
24. *paradoxus.*
Folia margine glabra; perianthium livide cæruleum.
25. *dubius.*
Pedicelli infimi stricti, capsulis 3–8-plo excedentes.
Pedicelli infimi demum 3–4 poll. longi; folia margine ciliata.
Perianthium 4½–5 lin. longum .... 26. *ciliatus.*
Perianthium 2½–3 lin. longum .... 27. *Pallasianus.*
Pedicelli infimi demum 9–18 lin. longi; folia margine haud ciliata.
Folia glauca; pedicelli demum 15–18 lin. longi.
28. *glaucus.*
Folia viridia; pedicelli demum 9 lin. longi. 29. *macrobotrys.*

1. H. CANDICANS, *Baker in Saund. Ref. Bot.* t. 174. Folia 4–5, lorata, carnoso-herbacea, planiuscula, glaucescentia, 2–2½ pedes longa, 18–21 lin. lata. Scapus firmus, 3–3½-pedalis. Racemus subpedalis, 12–20-florus, deorsum 5–6 poll. latus. Pedicelli cernui, infimi 15–18 lin. longi. Bracteæ lanceolatæ, 12–18 lin. longæ. Perianthium album, 18 lin. longum, segmentis oblongo-spathulatis flore expanso erecto-patentibus tubo duplo longioribus. Stamina prope faucem tubi subuniseriata, filamentis 5–6 lin. longis. Capsula oblonga, sessilis, obtuse angulata, seminibus confertis triquetris. *Cap. B. Spei*, Drège, 3529! *Natalia, ad fontem fluv. Fugela, In ditione Zulu,* Gerrard et M^cKen, 2146! *v. v. in hort. Saundersonii.*

2. H. PRINCEPS, *Baker in Saund. Ref. Bot.* t. 175. Folia 4–6, lorata, carnoso-herbacea, planiuscula, viridia, 2 pedes longa, 15–18 lin. lata. Racemus 12–18-florus, 6–8 poll. longus, 5–6 poll. latus. Pedicelli erecto-patentes, infimi 1½–2 poll. longi. Bracteæ lanceolatæ, 12–15 lin. longæ. Perianthium album, fundo extrorsum viride, 14–15 lin. longum, segmentis oblongo-spathulatis, flore expanso subpatulis tubo subæquantibus, interioribus brevioribus, latioribus, obtusioribus. Stamina prope basin tubi leviter biseriata, filamentis 8–9 lin. longis, basi cuneatis. Capsula oblonga, substipitata, obtuse angulata. *Kaffraria, in locis inundatis,* Mrs. Barber, 884 !

3. H. ORIENTALIS, *L. Sp.* 454 ; *Willd. Sp.* ii. 167 ; *Bot. Mag.* t. 937 ; *Bot. Reg.* t. 995 ; *Red. Lil.* t. 465 ; *Kunth, Enum.* iv. 303. Folia 4–6, carnoso-herbacea, viridia, 8–12 poll. longa, 4–6 lin. lata. Scapus 5–8-pollicaris. Racemus 6-12-florus, 3–4 poll. longus, expansus 2 poll. latus. Pedicelli floriferi cernui, 1–3 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium 10–12 lin. longum, segmentis oblongo-spathulatis 2 lin. latis, flore expanso subpatentibus tubo infundibuliformi demum ventricoso paulo brevioribus. Stamina infra medium tubi, uniseriata, filamentis vix 1 lin. longis. Capsula depresso-globosa, obtuse trigona, seminibus in loculo 8–12. *Oriens* ; *Syria, Libanus,* Gaillardot ! Miss Osborne ! *Asia Minor,* Kotschy, &c. *Græcia, Barbaria, Dalmatia.*

Var. β. PROVINCIALIS, *Baker.*—H. provincialis, *Jord. Pug.* 39 ; *Icones,* t. 219.—H. orientalis, *Reich. Ic.* t. 1005, *et auct. multi.* Gracilior, foliis viridioribus magis canaliculatis, floribus laxioribus paucioribus paulo minoribus, tubo demum ventricoso, segmentis ligulatis 1½ lin. latis. *Gallia meridionalis, Helvetia, Italia.*

Var. γ. ALBULUS, *Baker.*—H. albulus, *Jord. Pug.* 140 ; *Icones,* t. 217 ; *Gren. Fl. France,* iii. 216. Gracilior, foliis erectioribus, floribus paucioribus albidis, tubo cylindrico haud ventricoso, segmentis oblongis. *Gallia meridionalis,* Jordan.—H. præcox, *Jord. Pug.* 141 ; *Icones,* t. 216, H. modestus, *Jord. et Four. Icones,* t. 218, et H. rigidulus, *Jord. et Four. Icones,* t. 220, sunt etiam varietates hujus speciei in sensu latiore.

4. H. CORYMBOSUS, *Linn. Mant.* 223 ; *Thunb. Fl. Cap.* 325 ; *Jacq. Coll.* iii. 230, t. 19. fig. 2 ; *Andr. Rep.* t. 345.—Scilla corymbosa, *Bot. Mag.* t. 1885.—Massonia corymbosa, *Bot. Mag.* t. 991.—Periboea corymbosa, *Kunth, Enum.* iv. 293. Folia 5–6, carnoso-herbacea, semiteretia, 2–4 poll. longa, 1 lin. lata, pallide viridia. Scapus 2–3-pollicaris. Racemus confertus, 4–9-florus, pedicellis erecto-patentibus, infimis 2–6 lin. longis. Bracteæ perminutæ, deltoideæ. Perianthium lilacino-roseum, 6–7 lin. longum, segmentis erecto-patentibus ligulatis tubo subæquantibus. Stamina distincte biseriata, superiora e fauce, inferiora e medio tubi, filamentis filiformibus

1½ lin. longis. Ovarium sessile, obtuse trigonum, loculis 6–8 ovulatis. *Cap. B. Spei*, Masson! Nelson! Drège! Ecklon, 111! Zeyher, 1715! &c.

5. H. BREVIFOLIUS, *Thunb. Prodr.* 63; *Flor. Cap.* 325.—Scilla brevifolia et brachyphylla, *Roem. et Schult. Syst.* vii. 574.—S. brevifolia, *Gawl. Bot. Mag.* t. 1468.—Peribœa Gawleri et brevifolia, *Kunth, Enum.* iv. 293–94. Folia 4–5, carnoso-herbacea, semiteretia, 2–3 poll. longa, 1 lin. lata. Scapus folia superans. Racemus laxus, subsecundus, 6–8-florus, 1½–2 poll. longus. Pedicelli cernui, infimi 5–6 lin. longi. Bracteæ perminutæ. Perianthium 6–7 lin. longum, segmentis ligulatis erecto-patentibus tubum paulo superantibus. Stamina prope faucem tubi leviter biseriata, filamentis filiformibus antheras 4–6-plo excedentibus. *Cap. B. Spei* (*non vidi*).

6. H. AMETHYSTINUS, *L. Sp.* 454; *Willd. Sp.* ii. 167; *Red. Lil.* t. 14; *Sweet, Flow. Gard.* t. 135; *Bot. Reg.* t. 398; *Bot. Mag.* t. 2425; *Kunth, Enum.* iv. 304.—Brimeura amethystina, *Salisb. Gen.* 26.—H. hispanicus, *Lam. Encyc.* iii. 191. Folia 6–8, erecta, carnoso-herbacea, viridia, anguste linearia, 4–8 poll. longa, 2–3 lin. lata. Scapus 4–12-pollicaris. Racemus laxe 4–12-florus, expansus, 1–3 poll. longus, 12–15 lin. latus. Pedicelli floriferi erecto-patentes, apice cernui, infimi 3–6 lin. longi. Bracteæ lineares, violaceæ, 4–6 lin. longi. Perianthium saturate azureum, 4½–5 lin. longum, segmentis ovatis suberectis tubo ore 1–1½ lin. crasso triplo brevioribus. Antheræ prope medium tubi biseriatim subsessiles. Ovarium sessile, loculis 3–4-ovulatis. Capsula globosa, sessilis, 3–4 lin. longa et lata. *Hispania, Gallia meridionalis, Croatia, Bosnia.*

7. H. LEDEBOURIOIDES, *Baker*. Folia 3–4, carnoso-herbacea, lamina lineari-lanceolata 3–6 lin. lata, 12–18 lin. longa, in petiolum subæquilongum angustata. Scapus gracillimus, 2–3 poll. longus. Racemus laxus, 12–20-florus, 12–18 lin. longus, 6–8 lin. latus. Pedicelli 1 lin. longi, floriferi ascendentes. Bracteæ minutissimæ, deltoideæ. Perianthium 2–2½ lin. longum, albidum, membranaceum, segmentis lanceolatis cucullatis erecto-patentibus tubo anguste infundibuliformi subduplo brevioribus. Stamina supra medium tubi, distincte biseriata, subsessilia. Capsula sessilis, depresso-globosa, profunde obtuse trisulcata, vix 1 lin. longa, seminibus in loculo solitariis. *Africa austro-tropicalis orientalis, in ditione fluv. Zambesi*, Dr. Meller! Dr. Kirk! Ab speciebus reliquis recedit segmentis limbi, more *Drimiæ*, cucullatis.

8. H. AZUREUS, *Baker*.—Muscari azureum, *Fenzl, Delect. Sem. Vind.* 1858, *Tchih. As. Minor, Bot.* ii. 539. Folia 2–5, carnoso-herbacea, incurvo-patula, late linearia, navicularia, triente superiore sensim oblongo-dilatata, apice obtusissima, callose subfornicata. Scapus digi-

talis vel subpalmaris. Racemus densus, 4–12 lin. longus. Pedicelli sub anthesi cernui, fructiferi erecti. Perianthium campanulatum, azureum, fauce ampliatum, segmentis late ovatis porrectis concoloribus tubo dimidio brevioribus. Stamina prope basin perianthii inserta, dimidio tubi vix longiora. *Cilicia,* Kotschy.—*Leucophæo* affinis, teste *Tchih. loc. cit.*

9. H. PSEUDO-MUSCARI, *Baker.*—Bellevallia pseudo-muscari, *Bois. Diag.* ser. ii. iv. 110. Folia linearia, canaliculata, scapo longiora. Racemus densus, ovatus. Pedicelli cernui, floribus dimidio breviores. Perianthium cæruleum, campanulatum, apice haud constrictum, segmentis ovato-oblongis tubo subtriplo brevioribus. Stamina prope medium tubi biseriatim inserta, filamentis antheris subæquantibus. Capsula globosa, apice retusa. Habitu et magnitudine florum ad *Muscari neglectum* accedit. *Persia,* Buhse, *teste Boissier* (*non vidi*).

10. H. LEUCOPHÆUS, *Steven in Led. Ross.* iv. 156; *Reich. Ic. Crit.* iv. p. 27, t. 511.—Muscari leucophæum, *C. Koch, Linnæa,* xxii. 254; *Steven, Taur.* 337.—Hyacinthella leucophæa, *Schur, Oest. bot. Wochenbl.* 1856, p. 227.—Botryanthus stereophyllus, *Herbich, Oest. bot. Wochenbl.* 1855, p. 152; *Walp. Ann.* vi. 113.—Muscari pallens, *Besser, non aliorum.* Folia 2, anguste linearia, basin scapi cingentia, 4–6 poll. longa, 1½–2 lin. lata, striato-nervosa, in dimidio inferiore angustata. Scapus gracilis, 4–6-pollicaris. Racemus subdense 20–30-florus, 9–24 lin. longus, 6–8 lin. latus. Pedicelli erecto-patentes, infimi 1–1½ lin. longi. Bracteæ deltoideæ, perparvæ. Perianthium 1 lin. latum, 2 lin. longum, album vel pallide cæruleum, segmentis erectis tubo duplo brevioribus. Stamina supra medium tubi, subuniseriata, filamentis filiformibus antheris æquilongis. Capsula depresso-globosa, 1 lin. longa, profunde obtuse trisulcata. Semina in loculo 2. *Rossia meridionalis* (*Odessa, Podolia, Volhynia*), Besser, &c! *Georgia,* Pallas! *Transylvania, teste* Schur.

11. H. DALMATICUS, *Baker.*—H. pallens, *Vis. Fl. Dalm.* i. 150, *non M. Bieb.* Folia 2, carnoso-coriacea, glabra, lineari-lanceolata, vix lineato-nervosa, 2–3 poll. longa, 2–3 lin. lata, falcata. Scapus erectus, gracilis, 2–3-pollicaris. Racemus subdense 12–18-florus, expansus 1 poll. longus, 6–7 lin. latus. Pedicelli erecto-patentes, infimi ½–1 lin. longi. Bracteæ subobsoletæ. Perianthium pallide cæruleum, 2½ lin. longum, segmentis ovato-deltoideis erectis tubo demum ventricoso 1½ lin. crasso triplo brevioribus. Stamina supra medium tubi, subuniseriata, filamentis filiformibus antheris æquilongis. Capsula immatura globosa, 1 lin. longa, loculis biovulatis. *Dalmatia in subalpinis,* Petter, Exsic. 338! sub nomine *Scillæ bifoliæ.* Ad præcedentem arcte affinis.

12. H. SPICATUS, *Smith, Prodr. Fl. Græc.* 237; *Lindl. Bot. Reg.*

t. 1869.—Bellevallia spicata, *Boiss. Diagn.* vii. 110.—Foxia spicata, *Parl. Nuov. Gen.* 18.—Strangeveia hyacinthoides, *Bertol. Mem. Soc. Ital.* t. 21.—Puschkinia? dubia, *Kunth, Enum.* iv. 338.—Folia 6–8, linearia, carnoso-herbacea, 3–6 poll. longa, 2–3 lin. lata, basi angustata, subtiliter ciliata. Scapi 1–3-pollicares. Flores 6–12, dense subspicati. Bracteæ medio affixæ, lanceolatæ vel deltoideæ, 1–1½ lin. longæ. Perianthium obscure cæruleum, 3–4 lin. longum, segmentis oblongis subacutis flore expanso falcatis tubum excedentibus. Stamina ex fauce, uniseriata, filamentis deltoideis petaloideis bifidis basi breviter connatis antheris æquantibus haud ½ lin. longis. Capsula globosa, parva. Semina in loculo 5–6. *Græcia, Creta, Insulæ Ionicæ.*

13. H. SESSILIFLORUS, *Viv. Fl. Libyc.* 21, t. 7. fig. 5.—Bellevallia sessiliflora, *Kunth, Enum.* iv. 311.—Muscari sessiliflorum, *Spreng. Syst.* ii. 66.—H. nervosus, *Bert. Misc.* i. p. 2.—B. aleppica, *Boiss. Diagn.* ser. 2, iv. 11. Folia 2, basin scapi cingentia, coriacea, lanceolata, acuta, lineari-nervosa, 2–4 poll. longa, 3–5 lin. lata, margine minute ciliata. Scapus flexuosus, 2–6-pollicaris. Flores 6–20, dense spicati. Spica 6–21 lin. longa, expansa 6–8 lin. lata. Bracteæ minutissimæ. Perianthium pallide cæruleum, 2½–3 lin. longum, segmentis erecto-patentibus lanceolatis tubo ore 1 lin. crasso triplo brevioribus. Stamina ex fauce, uniseriata, filamentis complanatis, ut antheris, vix ultra ½ lin. longis. Loculi biovulati.—*Libya,* Viviani; *Egyptus,* Olivier, teste Kunth; *Aleppo,* Kotschy, *Pl. Alep. Kurd.* 15 (*sub nom.* Muscari ciliati)! *ad ripas fluv. Euphratæ, prope Port William,* Chesney!

14. H. LINEATUS, *Steud. in Roem. et Schult. Syst.* vii. 584.—Bellevallia lineata, *Kunth. Enum.* iv. 309.—B. Heldreichii, *Boiss. Diagn.* ser. 2, iv. 111. Folia 2, raro 3, basin scapi cingentia, coriacea, lanceolata, acuta, falcata, lineato-nervosa, 3–4 poll. longa, 3–6 lin. lata, primum minute ciliata. Scapi 2–4-pollicares. Racemus 6–12-florus, expansus 1 poll. longus, 6–8 lin. latus. Pedicelli infimi erecto-patentes, 1–1½ lin. longi. Bracteæ minutissimæ. Perianthium saturate violaceum, 1½–2 lin. longum, segmentis deltoideis erectis tubo 1 lin. crasso demum ventricoso 3–4-plo brevioribus. Stamina ex fauce, uniseriata, filamentis complanatis antheris subæquantibus. Loculi 2-ovulati.—*Smyrna,* Fleischer (*Unio Itin.* 1827, *sub nomine falso* H. ciliati)! *Adalia,* Heldreich! *Cappadocia,* Montbret! *Taurus,* Aucher Eloy, 2116!

15. H. HISPIDUS, *Baker.*—Bellevallia hispida, *J. Gay, Bull. Soc. Bot. France,* iii. 240, ex parte. Folia 2 vel 3, basin scapi 2–3 poll. arcte cingentia, parte libera lanceolata, 2–3 poll. longa, 3–7 lin. lata, coriacea, acuta, lineato-nervosa, margine conspicue ciliata, facie utrinque glabra, deorsum dorso subtiliter purpureo maculata. Scapi firmi,

erecti, 6–12 poll. longi, interdum geminati. Perianthium pallide cæruleum, 1- 1½ lin. longum, segmentis tubo triplo brevioribus. Racemus 10–20-florus, fructiferus 1–2 poll. longus, deorsum 1 poll. latus pedicellis erecto-patentibus, infimis 3–4 lin. longis. Capsula globosa, 1 lin. longa, obtuse trigona. Semina in loculo 1–2. *Phrygia, prope Ouchak,* Balansa!

Var. β. PLATYPHYLLUS, *Gay, Herb.* Pars libera foliorum ovata, 2 poll. longa, medio 9–12 lin. lata, venis distincte exsculptis utrinque costam circiter 10. *Phrygia, ad montem Mourad-Dagh,* Balansa! Planta Cilicica Balansana sub No. 815 in Exsic. ejus, sub nomine Gayano *Scillæ hispidæ* divulgata, est species alia, in statu fructifero tantum nota, ex vestigiis perianthii obviis verisimiliter ad *Scillam* referenda.

16. H. FASTIGIATUS, *Bert. Ann. Stor. Nat.* iv. 62; *Fl. Ital.* iv. 157; *Gren. et Godr. Fl. Franc.* iii. 217.—H. Pouzolzii, *Gay in Lois. Not.* 15; *Parl. Fl. Ital.* ii. 484.—Scilla fastigiata, *Viv. App. Cors.* 1. Folia 2–3, carnoso-herbacea, filiformia, subteretia, 3–4 poll. longa, 1 lin. lata, sæpe inferne bulbifera. Scapus flaccidus, 1–2-pollicaris. Racemus dense subcorymbosus, 3–6-florus. Pedicelli erecto-patentes, infimi 3–6 lin. longi. Bracteæ ovatæ, cuspidatæ, 2–3 lin. longæ. Perianthium lilacinum, 3½–4 lin. longum, segmentis oblongo-lanceolatis barbulatis tubo turbinato subæquantibus. Stamina e fauce, uniseriata, filamentis deorsum complanatis antheris æquilongis. Loculi 2–3-ovulati. *Corsica,* Pouzols! Kralik 802! Requien! Soleirol! &c. Habitu ad *Scillam vernam* arcte accedit.

17. H. MICRANTHUS, *Baker.*—Bellevallia micrantha, *Boiss. Diagn.* v. 63. Folia 2, basin scapi longe cingentia, carnoso-herbacea, glabra, falcata, linearia, 2–2½ poll. longa, 1–1½ lin. lata, obtusa. Scapus gracilis, 2–3 poll. longus. Flores 6–12, dense spicati. Spica 3–6 lin. longa, 2–3 lin. lata. Perianthium pallidum, 1 lin. longum, late infundibuliforme, segmentis deltoideis erectis tubo 4-plo brevioribus. Antheræ e fauce tubi, uniseriatæ, subsessiles. *Asia Minor,* Aucher Eloy, 2115!

18. H. NIVALIS, *Baker.*—Bellevallia nivalis, *Boiss. et Kotschy, Diag.* ser. 2, iv. 110. Folia 3–4, carnoso-coriacea, anguste linearia, 3–4 poll. longa, 2–3 lin. lata, margine glabra. Scapus 1½–2-pollicaris. Racemus subdense 8–12-florus, expansus vix 1 poll. longus. Pedicelli brevissimi, infimi vix ultra ½ lin. longi. Bracteæ minutissimæ. Perianthium pallide cæruleum, 2½ lin. longum, segmentis lanceolatis tubo triplo brevioribus. Stamina ex fauce, uniseriata, filamentis brevibus complanatis. Capsula globosa, 1 lin. longa, obtuse trigona. *Syria prope Damascum,* Kotschy, *Iter Syriacum,* 1855, No. 58! *Cyprus,* Kotschy, 411.

19. H. PYCNANTHUS, *Baker.*—Muscari pycnanthum, *C. Koch, Linnæa,*

xxii. 253; *Led. Fl. Ross.* iv. 154. Folia 2–3, carnoso-herbacea, linearia, 4–6 poll. longa, 4–6 lin. lata, utrinque angustata, margine glabra. Scapus gracilis, 4–6-pollicaris. Racemus 8–12-florus, expansus 1 poll. longus, 6–8 lin. latus. Pedicelli cærulei, infimi 1½ lin. longi, patentes vel cernui. Bracteæ minutæ, lanceolatæ. Perianthium saturate diutine cæruleum, 2 lin. longum, segmentis deltoideis erectis tubo 3–4-plo brevioribus. Stamina ex fauce, uniseriata, filamentis antheris æquilongis. *Caucasus,* C. Koch. *Armenia,* Calvert 1366!

20. H. ROMANUS, *Linn. Mant.* 224; *Willd. Sp.* ii. 169; *Red. Lil.* t. 334; *Sibth. et Sm. Fl. Græc.* 340.—Bellevallia romana, *Reich. Fl. Germ.* 105; *Ic.* t. 1002; *Parl. Ital.* ii. 486; *Kunth, Enum.* iv. 307.—Scilla romana, *Gawl. Bot. Mag.* t. 939.—Bellevallia appendiculata *et* operculata, *Lap.* Folia 4–5, erecto-patentia, viridia, glabra, carnoso-herbacea, 12–18 poll. longa, 4–6 lin. lata, e medio utrinque sensim angustata. Scapus 6–12-pollicaris. Racemus 20–30-florus, expansus 2–3 poll. longus, 1–2 poll. latus. Pedicelli floriferi erecto-patentes, infimi 3–6 lin. longi. Bracteæ parvæ, deltoideæ. Perianthium album vel pallide cæruleum, 4–4½ lin. longum, segmentis lanceolatis subacutis tubo æquilongis. Stamina ex fauce, uniseriata, filamentis complanatis 1 lin. longis. Capsula globosa, 6 lin. longa et lata, obtuse trigona. Semina in loculo 1–2. *E Barbaria et Gallia meridionali ad Cyprum, Græciam, et Ægyptum.*

21. H. TRIFOLIATUS, *Ten. Neap.* iii. 376, t. 136.—Bellevallia trifoliata, *Kunth, Enum.* iv. 308; *Gren. et Godr. Fl. France,* iii. 217; *Parl. Fl. Ital.* ii. 492.—H. abortivus, *Cavalier, Notes,* 14, t. 1. fig. A. Folia 3, lorata, carnoso-herbacea, basin scapi cingentia, 1½–2 pedes longa, 6–9 lin. lata, margine minutissime ciliata. Scapus pedalis vel ultra. Racemus 10–30-florus, expansus 2–3 poll. longus, 16–18 lin. latus. Pedicelli floriferi infimi patentes vel cernui, 2–3 lin. longi. Bracteæ parvæ, deltoideæ. Perianthium 6–7 lin. longum, tubo infundibuliformi violaceo ore 1½–2 lin. crasso, segmentis oblongis obtusis viridibus tubo 3–4-plo brevioribus. Stamina ex fauce, uniseriata, filamentis complanatis 1 lin. longis. Capsula late elliptica, utrinque subtruncata. Semina in loculo 1–2. *Gallia meridionalis, Italia, Rhodus, Algeria, Græcia, Cyprus.*

22. H. AUCHERI, *Baker.* Folia 3, basin scapi cingentia, carnoso-coriacea, linearia, 6–8 poll. longa, 4–6 lin. lata, margine glabra. Scapus firmus, 3–4-pollicaris. Racemus dense 20–25-florus, expansus 1½ poll. longus, 14–15 lin. latus. Pedicelli infimi floriferi cernui, 2½–3 lin. longi. Perianthium 6 lin. longum, segmentis ovato-lanceolatis suberectis tubo ore 2 lin. crasso duplo brevioribus. Bracteæ minutæ, deltoideæ. Stamina ex fauce, uniseriata, filamentis basi cuneatis antheras paulo excedentibus. *Persia, prope Ispahan,* Aucher Eloy, 5396!

23. H. **DENSIFLORUS**, *Baker.*—Bellevallia densiflora, *Boiss. Diagn.* vii. 109. Folia 2–3, linearia, carnoso-herbacea, glabra, 5–6 poll. longa, 2–3 lin. lata. Scapus 3–4-pollicaris. Racemus dense 20–30-florus, expansus 15–18 lin. longus, 1 poll. latus. Pedicelli infimi floriferi 3–4 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium pallidum, 4½–5 lin. longum, segmentis lanceolatis tubo ore 1 lin. crasso triplo brevioribus. Stamina ex fauce, uniseriata, filamentis complanatis vix ultra ½ lin. longus. *Syria orientalis,* Aucher Eloy, 2121!

24. H. **PARADOXUS**, *Fisch. et Meyer, Ind. Sem.* i. 30 (*ex descriptione brevi*).—Muscari paradoxum *et* montanum, *C. Koch, Linnæa,* xxii. 253; *Led. Fl. Ross.* iv. 153.—Bellevallia flexuosa, *Boiss. Diagn.* xiii. 36! Folia 3–4, basin scapi cingentia, carnoso-herbacea, lorata, 6–12 poll. longa, 3–6 lin. lata, margine primum minute ciliata. Scapus firmus, 3–12-pollicaris. Racemus sublaxe 6–20-florus, expansus 1–3 poll. longus, 12–18 lin. latus. Pedicelli infimi patentes vel ascendentes 3–4 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium 4–4½ lin. longum, obscure coloratum, segmentis ovato-lanceolatis erectis tubo ore 1½ lin. crasso 2–3-plo brevioribus. Stamina ex fauce, uniseriata, filamentis antheris subæquilongis. Capsula subglobosa, 4–4½ lin. longa, acute angulata. Semina in loculo solitaria in exemplis nostris. *Syria,* Blanche 94! *Magdala,* Lowne! *Hierosolyma,* Dr. Roth! Miss Osborne 178! *Caucasus,* C. Koch (*an eadem? non vidi*).

Var. β. **CONFERTUS**, *Baker.* Scapi 2-3 poll. longi. Racemi densiores, floribus superioribus sessilibus, inferioribus pedicellis erecto-patentibus vix ultra ½ lin. longis instructis. *In Palestina, prope Jericho,* Lowne!

25. H. **DUBIUS**, *Guss. Cat.* 1821, p. 32; *Prodr.* 424.—Bellevallia dubia, *Reich. Excurs.* i. 105; *Kunth, Enum.* iv. 308; *Parl. Fl. Ital.* ii. 488. B. Gussoneana, *Griseb. Fl. Rumel.* ii. 387.—B. Webbiana, *Parl. Nuov. Gen.* 19; *Fl. Ital.* ii. 489. Folia 3–5, anguste lorata, glaucescentia, carnoso-herbacea, glabra, 9–15 poll. longa, 3–6 lin. lata, e medio utrinque angustata. Scapus 9–15-pollicaris. Racemus laxe 12–30-florus, expansus 2–3 poll. longus, 1 poll. latus. Pedicelli infimi floriferi patentes, 2–3 lin. longi, fructiferi erecto-patentes, 3–5 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium cæruleum, 3½–4 lin. longum, segmentis ovato-deltoideis tubo ore 1½ lin. crasso triplo brevioribus. Stamina ex fauce, uniseriata, filamentis deorsum complanatis antheris æquantibus. Capsula obovoidea, 4 lin. longa, acute trigona, seminibus in loculo 1–2. *Italia,* Webb! *Sicilia,* Parlatore! Huet de Pavillon! Gussone! &c. *Creta,* Zuccarini! *Dalmatia.*

26. H. **CILIATUS**, *Cyrill. Neap.* ii. 22, t. 10; *M. Bieb. Fl. Taur. Cauc.* i. 284; *Ten. Neap.* iii. 376, t. 135.—Bellevallia ciliata, *Nees, Gen.* iv. t. 8. fig. 4, 5, 22; *Kunth, Enum.* iv. 308; *Parl. Fl. Ital.* ii. 491.—

Muscari ciliatum, *Gawl. Bot. Reg.* t. 394; *Ledeb. Fl. Ross.* iv. 153. —H. sarmanticus, *Pallas, Nov. Act. Petr.* x. 309. Folia 4–6, lorata, carnoso-herbacea, 8–15 poll. longa, 6–12 lin. lata, margine primum distincte ciliata. Scapus firmus, 6–12-pollicaris vel ultra. Racemus laxe 30–60-florus, floriferus 4–8 poll. longus. Pedicelli floriferi flexuosi, infimi 1–3 poll. longi, fructiferi stricti, horizontaliter patentes, infimi 3–4 poll. longi. Bracteæ minutæ, deltoideæ. Perianthium lividum, 4½–5 lin. longum, segmentis erectis ovato-lanceolatis tubo ore 1½ lin. crasso triplo brevioribus. Stamina ex fauce, uniseriata, filamentis basi cuneatis 1 lin. longis. Capsula obovato-oblonga, 6 lin. longa. Semina in loculo 1–2. *Ex Algeria,* Bové! *et Italia ad Tauriam, Iberiam, Kurdistan,* Chesney, 88! 106! Brant! *et Beloochistan,* Stocks!

27. H. **Pallasianus**, *Stev. Taur.* 337.—H. amethystinus, *Pallas, Iter,* iii. 589, *non Linnæus.*—H. patentissimus, *Pallas, MSS.* Folia 4–5, carnoso-herbacea, lorata, 6–9 poll. longa, 6–8 lin. lata, margine primum ciliata. Scapus 6–9-pollicaris. Racemus laxe 20–40-florus, floriferus 2–4 poll. longus. Pedicelli floriferi flexuosi, infimi 6–24 lin. longi, fructiferi stricti, subpatentes, infimi 3–4 poll. longi. Perianthium 2½–3 lin. longum, purpureo-lividum, segmentis deltoideis tubo ore 1 lin. crasso subduplo brevioribus. Stamina ex fauce, uniseriata, filamentis antheris subæquilongis. Capsula oblonga, 4½–5 lin. longa, acute trigona. Semina in loculo 1–2. *Odessa et Caucasus,* Pallas!

28. H. **glaucus**, *Baker.*—Muscari glaucum, *Lindl. Bot. Reg.* t. 1085; *Roem. et Schult. Syst.* vii. 1709.—Bellevallia glauca, *Kunth, Enum.* iv. 309.—M. Wilhelmsii, *Stev. Taur.* 336? Folia 5–6, carnoso-herbacea, glauca, lineari-lorata, 6–12 poll. longa, 4–8 lin. lata, margine haud ciliata. Scapus firmus, 6–12-pollicaris. Racemus laxe 30–50-florus, floriferus 3–4 poll. longus. Pedicelli floriferi flexuosi, infimi 6–18 lin. longi, fructiferi stricti, subpatentes, infimi 15–18 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium 4 lin. longum, purpureo-viride, segmentis erectis ovato-lanceolatis tubo ore 1½ lin. crasso 2–3-plo brevioribus. Stamina ex fauce, uniseriata, filamentis basi cuneatis antheris subæquilongis. Capsula ovoidea, 5–6 lin. longa, acute trigona. Semina in loculo 1–2. *Persia australis,* Kotschy 23! *Afghanistan,* Griffith, 5798! *Beloochistan,* Stocks!

29. H. **macrobotrys**, *Baker.*—Bellevallia macrobotrys, *Boiss. Diagn.* xiii. 35. Folia lorata, viridia, scapo elato subæquilonga, margine primum minute serrulata. Racemus laxus fructiferus pedalis vel ultra. Pedicelli floriferi floribus æquilongi, fructiferi eis triplo longiores, tunc arcuato-patentes. Perianthium 3 lin. longum, cæruleum, demum lividum, segmentis tubo subtriplo brevioribus. Filamenta basi dilatata, antheris rubello-ferrugineis. *Palestina,* Boissier (*non vidi*).

23. RHADAMANTHUS, *Salisb.*

Salisb. Gen. 37.—Hyacinthi, sp., *Linn.*

Perianthium campanulatum, segmentis ovatis obtusis æqualibus erectis tubo subæquantibus. *Stamina* ad medium tubi, subuniseriata, inclusa, filamentis brevibus erectis deorsum complanatis, antheris lineari-oblongis adnatis superne foramine obcuneato dehiscentibus. *Ovarium* ovoideum, sessile, leviter trisulcatum, ovulis in loculis 9–10; *stylus* brevis, rectus; *stigma* capitatum. *Capsula* membranacea, sessilis, ovoidea, loculicide trivalvis, seminibus discoideis uniseriatis alatis 6–8 in loculo. *Testa* nigra. *Herba bulbosa, floribus laxe racemosis, foliis subteretibus hysteranthiis carnoso-herbaceis.*

1. R. CONVALLARIOIDES, *Salisb. Gen.* 37.—Hyacinthus convallarioides, *Linn. Suppl.* 204; *Thunb. Fl. Cap.* 326; *Jacq. Schoen.* t. 81; *Kunth, Enum.* iv. 305. Folia 9–10, 2½–3 poll. longa, lineari-subulata, facie canaliculata. Scapus ante folia productus, 3–6 poll. longus. Racemus 6–20-florus. Pedicelli 3–4 lin. longi. Bracteæ minutæ, deltoideæ. Perianthium 3–3½ lin. longum, albidum, viridi-purpureo vittatum. *Cap. B. Spei*, Masson!

24. PUSCHKINIA, *Adams.*

Adams, Nov. Act. Petr. xiv. 164, t. B; *Endl. Gen.* 1135; *Kunth, Enum.* iv. 337; *Salisb. Gen.* 27.—Adamsia, *Willd. Berl. Mag.* ii. 16.

Perianthium rotatum, campanulato- vel infundibuliformi-gamophyllum, segmentis ligulatis æqualibus flore expanso horizontaliter patentibus tubo longioribus. *Corona* membranacea, ad faucem tubi imposita, profunde 6-fida, dentibus emarginatis vel integris. *Stamina* intra prope basin coronæ imposita, *filamentis* brevibus, *antheris* lineari-oblongis versatilibus. *Ovarium* sessile, oblongum, obtuse trigonum, ovulis in loculo 5–6; *stylus* filiformis, brevis; *stigma* capitatum. *Capsula* sessilis, membranacea, loculicide trivalvis, seminibus in loculo paucis, parvis, haud compressis. *Testa* nigra. *Herbæ parvæ bulbosæ foliis planiusculis geminatis synanthiis, floribus paucis laxe racemosis raro solitariis.*

Tubus campanulatus, segmentis 2–3-plo brevior.
1. *scilloides.*

Tubus infundibuliformis, segmentis paulo brevior.
2. *hyacinthoides.*

1. P. **scilloides**, *Adams, Nov. Acta Petrop.* xix. 164; *Bieb. Pl. Ross.* ii. t. 91; *Bot. Mag.* t. 2244. *Kunth, Enum.* iv. 338.—Adamsia scilloides, *Willd. Enum. Suppl.* 16.—P. libanotica, *Zucc. Kunth, Enum.* iv. 680. Folia 2, carnoso-herbacea, lineari-lorata, basin scapi longe cingentia, scapo subæquantia, viridia, 3–6 lin. lata. Scapus gracilis, 6–9-pollicaris. Racemus 1–6-florus. Pedicelli erecto-patentes, infimi 3–4 lin. longi. Perianthium 5–6 lin. longum, albido-cæruleum, segmentis obtusis 1½ lin. latis, tubum campanulatum 2–3-plo excedentibus. Corona segmentis 3–4-plo brevior, dentibus integris vel emarginatis. *Caucasus,* Klustine! Hohenacker! *Karabagh,* Fischer! Szovitz! *Armenia,* Aucher Eloy, 5392! *Kurdistan,* Capt. Garden! *Libanus,* Erdl!

2. P. **hyacinthoides**, *Baker.* Folia 2, carnoso-herbacea, lineari-lorata, basin scapi longe cingentia, scapum excedentia, 3–4 lin. lata. Scapus gracilis, 3–4-pollicaris. Racemi conferti, secundi, 4–6-flori, pedicellis infimis 1–1½ lin. longis. Perianthium album, 4 lin. longum, segmentis 1 lin. latis tubum infundibuliformem paulo excedentibus. Corona 1 lin. longa, dentibus truncatis emarginatis. *Kurdistan, Oroomah,* Capt. Garden!

25. CHIONODOXA, *Boiss.*

Boiss. Diagn. v. 61; *Jaub. et Spach, Ill.* t. 443.—Hyacinthi *sp. Auct.*

Perianthium rotatum, campanulato- vel infundibuliformi-gamophyllum, segmentis ligulatis æqualibus flore expanso patentibus tubum 2–3-plo excedentibus. *Stamina* ad faucem tubi, uniseriata, filamentis cuneatis petaloideis, antheris linearibus bifidis versatilibus. *Ovarium* globosum, obtuse trigonum, ovulis in loculo pluribus; *stylus* subnullus; *stigma* capitatum. *Capsula* sessilis, membranacea, loculicide trivalvis, seminibus in loculo paucis, parvis, haud compressis. *Testa* nigra. *Herbæ parvæ bulbosæ foliis planiusculis geminatis, floribus paucis laxe racemosis vel sæpe solitariis.*

Scapi uni- vel raro biflori.
  Filamenta æqualia.
    Perianthium 5–6 lin. longum, segmentis tubum 2–3-plo excedentibus .... 1. *nana.*
    Perianthium 7–8 lin. longum, segmentis tubum paulo excedentibus .... 2. *cretica.*
  Filamenta alterna longiora et angustiora ...... 3. *Luciliæ.*
Scapi 1–4-flori .... 4. *Forbesii.*

1. C. **nana**, *Boiss. et Held. in Boiss. Diagn.* xiii. 24.—Hyacinthus nanus, *Roem. et Schult. Syst.* vii. 581; *Kunth, Enum.* iv. 304.—Puschkinia scilloides, *Sieber, Crete,* ii. 319, t. 7, *non Adams.* Folia 3–4 poll. longa, 1–1½ lin. lata. Scapus filiformis, foliis subæquans,

uniflorus. Perianthium 5–6 lin. longum, segmentis 1 lin. latis tubum 2–3-plo excedentibus. Filimenta ¾ lin. longa, deorsum ¼ lin. lata. *Creta, in regione subalpina,* Von Heldreich!

2. C. CRETICA, *Boiss. et Held. in Boiss. Diagn.* xiii. 24; *Jaub. et Spach, Ill.* t. 433. Folia 6–9 vel demum 12 poll. longa, 3–6 lin. lata. Scapus gracilis, 6–10-pollicaris, uni- vel raro biflorus. Perianthium 7–8 lin. longum, segmentis ligulato-spathulatis 1½–2 lin. latis tubo infundibuliformi vix ultra 1 lin. crasso paulo longioribus. Filamenta 1 lin. longa, ⅓–¼ lin. lata. *Creta in regione subalpina,* Von Heldreich!

3. C. LUCILIÆ, *Boiss. Diagn.* v. 61. Folia 3–4 poll. longa, 1½–2 lin. lata. Scapus gracilis, foliis subæquans, uni- vel raro biflorus. Perianthium 7–8 lin. longum, segmentis ligulato-spathulatis, 1½–2 lin. latis, tubo 2–3-plo longioribus. Filamenta inæqualia, alterna 1½ lin. longa et ½ lin. lata, et 1 lin. longa et ¾ lin. lata. *Asia Minor; Tmolus ad nives deliquescentes,* Boissier!

4. C. FORBESII, *Baker.* Folia 6–8 poll. longa, 2–3 lin. lata. Scapus gracilis, foliis subæquans uni- vel sæpe laxe 2–4-flori. Pedicelli erecto-patentes, infimi 9–21 lin. longi. Perianthium 6 lin. longum, saturate cæruleum, segmentis 1¼–1½ lin. latis tubum turbinatum pallidum triplo excedentibus. Filamenta æqualia, oblongo-ligulata, 1 lin. longa. *Lycia,* Prof. E. Forbes 625!

Var. β. IDÆA, *Baker.* Perianthium albidum, vix ultra 4–5 lin. longum. Pedicelli breviores, infimi 6–9 lin. longi. *Creta, ad verticem montis Idæ,* Lieut. Spratt!

26. ODONTOSTEMUM, *Torrey.*

Torrey, Bot. Whipple, 94, t. 24.

Perianthium tubuloso-gamophyllum, segmentis æqualibus lanceolatis demum reflexis tubo subæquantibus. *Stamina* fertilia 6, ex fauce tubi, uniseriata, filamentis brevibus basi connatis cum staminodiis 6 linearibus alternantibus, antheris oblongis versatilibus. *Ovarium* sessile, globosum, obtuse trigonum, ovulis in loculo geminatis, collateralibus; *stylus* elongatus, filiformis; *stigma* stipitatum. *Capsula* sessilis, globosa, loculicide trivalvis, seminibus in loculo 1–2. *Herba bulbosa, caule divaricatim ramoso deorsum foliato, foliis graminoideis, ramis floriferis racemosis.*

1. O. HARTWEGII, *Torrey, loc. cit.*; *Wood, Proc. Acad. Phil.* 1867, p. 174. Folia anguste linearia, 6–9 poll. longa, 3–5 lin. lata, subcoriacea, acuta, persistentia. Caulis 1½–2-pedalis. Racemi laxe 10–30-flori, 3–6 poll. longi, 10–12 lin. lati. Bracteæ lineares, inferiores 2–3 lin. longæ. Pedicelli stricti, erecto-patentes, 3–6 lin. longi. Perianthium albidum, 5–6 lin. longum. Stamina segmentis 6–8-plo breviora. *California,* Hartweg, 2008! Lobb 165! Whipple!

Note on *Althæa Ludwigii* and *Cystanche tubulosa*.

By N. A. Dalzell, Esq.

[Read November 4, 1869.]

Having had occasion to spend a month or so in the district of Mahine, on the Konkun coast, which is between the 19th and 20th degrees of latitude, I there discovered two plants which, as far as I am aware, have not been seen by any botanist, either in this Presidency or in any other part of the peninsula of India. These plants are the *Althæa Ludwigii* and the *Cystanche tubulosa* of R. Wight. Both plants were well known to me as natives of the banks of the Indus, where I gathered them in 1859. This discovery led me to conjecture as to the manner in which these plants had reached this tract of country. This tract, for thirty or forty miles north and south, is a tolerably level plain raised a few feet above the highest tides. It is covered by a layer of the finest silt, variable in depth, and resting immediately on trap-rock. In this silt not a stone or pebble is to be seen, and in the rainy season it has the consistency of soft soap.

I did not observe the *Althæa* growing on the natural surface of the ground, but only where the surface soil had been removed, while the *Cystanche* was found growing in soft mud within a few yards of the salt water, and, if I recollect right, the plant on which it grew parasitically was the *Calotropis*. The seeds of these two plants are minute, and might easily be carried along by currents to long distances; and reviewing all the circumstances, I could come to no other conclusion than that the soil of this district, as well as the seeds, had been brought down by the flooded waters of the Indus, and deposited on the spot where they are now found. This conjecture is borne out by independent evidence of the rising of the coast, there being raised beaches of sand and shingle in many parts of this coast; and in one place the coast-road passes through a cutting in this shingle. In fact, there is evidence of a rising of the coast from the Gulf of Cambay down to Rutnaghery, canoes having been found twelve miles inland on the Kattyawar coast, and marine shells in the mud when cleaning out inland fresh-water ponds.

A reference to a map of India will show that the flooded waters of the Indus would pass along the smooth coast of Kattyawar, and, keeping the direction thus given to them, would impinge on the very spot where the plants mentioned have been found.

Some persons will perhaps not easily accept this explanation, and they will not unnaturally express a doubt as to seeds so exposed to salt water, and lying for it is impossible to say how long in the mud, retaining any vitality; but I see no other way in which to account for the appearance of these plants on the Konkun coast.

On the Commelynaceæ of Bengal. By C. B. CLARKE, M.A., F.L.S., Officiating Superintendent of the Botanic Garden, Calcutta. Communicated by Dr. ANDERSON, F.L.S.

[Read February 17, 1870.]

THE present paper is intended to describe all the species of the Order Commelynaceæ which grow within the political area administered by the Lieut.-Governor of Bengal. With the exception of three species, all are known to me growing wild. I have had three dried collections to work with, viz. my own, the Calcutta Herbarium collection, and the private collection of Mr. Kurz, the Curator of the Herbarium, which contains many Java specimens authoritatively named by Dr. Hasskarl. I am also indebted to Mr. Kurz for selecting ready to my hand the modern literature bearing on the subject.

The books which I have been able to consult are:—

1. Roxburgh's 'Flora Indica,' Carey's edition.
2. Roxburgh's original figures preserved in the Calcutta Herbarium.
3. Wight's 'Icones Plantarum,' vol. vi.
4. Kunth's 'Enumeratio Plantarum,' vol. iv.
5. Hasskarl in 'Plantæ Junghuhnianæ,' published 1852.
6. Miquel's 'Flora Bataviæ,' vol. iii.
7. Hasskarl on *Forrestia*, 'Regensburg Flora,' no. 40, 1864.
8. Hasskarl, "Genera Commelynacearum," 'Regensburg Flora,' no. 14, 1866.
9. Dalzell in Hooker's 'Journal of Botany,' vol. iii.
10. Thwaites's 'Enumeratio Plantarum Zeylaniæ.'
11. Bentham's 'Flora of Hongkong.'

The main object kept in view in this paper is, not the creation of the largest possible number of new and imperfectly known species, but to clear up the synonymy of, and give definite characters for, the common Bengal species. I have been very careful not to overload the specific descriptions; and I have taken my distinctions from the number of cells and manner of dehiscence of the capsules, and from the number, form, and sculpture of the seeds. I do not assume that these characters are absolute; but I am satisfied that they are far more trustworthy than those usually depended upon by authors; and, moreover, they can readily be worked on dried specimens, unless, as is too often the case, the fruiting specimens have, in order to make the leaves prettily flat, been dried under such pressure as to crush the capsules and scatter all the ripe seeds.

As I enumerate only twenty-five species in all, I have not attempted to rearrange the genera of the order or to discuss questions of nomenclature, but I have reduced my materials on Kunth's 'Enumeratio' as a standard. This work is still the most useful catalogue of the order; and I hope that by adopting the genera and names in it I shall facilitate reference.

The allegations in the following paper are stated absolutely, for brevity only; and with each must be supplied the limitation, "in my opinion," and "so far as I have at present seen."

Genera and Species described.

COMMELYNA. C. communis, C. salicifolia, C. Bengalensis, C. Kurzii (n. sp.), C. Rajmahlensis (n. sp.), C. obliqua, C. Simsoni (n. sp.), C. rugulosa (n. sp.).

ANILEMA. A. scapiflorum, A. herbaceum, A. nanum, A. nudiflorum, A. ensifolium, A. vaginatum, A protensum.

POLLIA. P. indica, P. subumbellata (n. sp.).

DITHYROCARPUS. D. paniculatus.

CYANOTIS. C. axillaris, C. cristata, C. barbata, C. nodiflora.

STREPTOLIRION. S. volubile.

FORRESTIA. F. Hookeri, F. glabrata.

COMMELYNA, *Kunth, Enum.*

Heterocarpus, *Wight, incl.*

Stamina 3 perfecta (quorum unum dissimile), 3 vel 2 sterilia difformia. *Ovula* 5 vel 3, 2. *Pedunculi* 2 (quorum unus haud raro rudimentarius vel obsoletus) ex spatha complicata aut cucullata orti eaque subinclusi. *Capsula* 5–1-sperma.

Sect. I. Capsulæ loculi 3, quorum unus clausus.

a. Ovula 5. Semina (nisi casu) 5; in *C. salicifolia* β, semen abortu unicum.

b. Ovula 3. Semina (nisi casu) 3; in *Heterocarpo* semen abortu unicum.

Sect. II. Capsulæ loculi 3 aut 2, omnes dehiscentes. Ovula et semina tot quot loculi.

On both the peduncles the innermost flower expands first; and the tendency of each successively expanding flower to become male is greater than in its predecessor. Also the tendency to become male is far greater in the first-expanding long-peduncled lower raceme than in the upper one. The innermost flower on the upper raceme is always perfect, and generally the next to it, sometimes more. But on the lower raceme the innermost flower even is generally male; and this lower raceme is often rudimentary, sometimes obsolete; and these three cases all occur in one species. Moreover, when the long peduncle exists carrying (as nearly always) male flowers only, it falls off at its articulation before the other peduncle comes well into flower; and thus has been increased the discrepancy in the description of plants so well known and well marked as *C. bengalensis*. In the stamens a great change (as in most orders) takes place at the moment of expansion: the anthers are often all yellow and subsimilar till that moment; but then the two outside stamens' anthers turn blue, and the middle stamens' anthers enlarge, become divaricate, and twisted at the base.

I have united (vide *C. obliqua* below) the most viscid hairy plant of the genus with a particularly glabrous form.

Having thus discarded several marks relied on for specific distinctions in this genus, I have taken up characters derived from the fruit. It has been objected to me, by the highest authority, that in the *Commelyna communis* bundle of the Kew Herbarium the capsules are as often 4–3-seeded as 5-seeded. I have examined such a very large number of individuals of this species here, that I confidently state that no such amount of variation in the fruit will be found in *C. communis* as it grows in Bengal; and from the state in which the genus *Commelyna* usually exists in herbaria, I am not disposed to attach much weight to this objection.

Systematic books usually attribute to the order Commelynaceæ an embryo opposite the hilum. The seeds in this order are generally so essentially unsymmetrical that it is hard to say where the axis of the seed is; but in the seeds of *C. obliqua* and other species where the axis is definite, I find the embryo not directly opposite the hilum, but placed very obliquely.

The sections I have taken for the Bengal *Commelynæ* represent the three arragements of the capsule.

In Sect. I. *a*, the capsule is essentially unsymmetrical. Two of its cells contain each two superimposed seeds and dehisce; the third cell contains one much larger and differently shaped seed, and is strictly indehiscent; it finally withers on the seed so firmly that it can hardly be removed with a knife; it remains a long time on the peduncle; and I much suspect some of the species described as 1-seeded. The 1-seeded cell is placed lower down the axis than the other two.

The two seeds in one of the dehiscent cells fit very closely one upon the other, and form together a shape mimicking that of the solitary seed. I think it not improbable that some of those who have found but three seeds in *C. communis* have had not well-ripe specimens, and have counted the two superimposed seeds as one, instead of satisfying themselves as to the number of the embryos.

Pictures of this type of capsule will be found in Webb and Berthelot's 'Canary Isles,' plates 238, 239, and in Wight's 'Icones,' t. 2065. figs. 7, 8.

In Sect. I. *b*, the capsule is slightly unsymmetrical; two of the cells containing each one seed dehisce; the third cell is placed slightly lower, is somewhat gibbous, and is strictly indehiscent, withering firmly on the seed and remaining a long time on the peduncle. The three seeds are nearly equal and similar, and like the solitary seed in Sect. I. *a*. The capsule and seeds, at first sight, appear exactly as in Sect. I. *a*, the two superimposed seeds sticking a little closer together than usual.

In Sect. II. the capsule is symmetrical in all respects, contains one seed in each cell; and all the cells dehisce. The seeds are in shape like the large solitary seed in Sect. I. *a*.

Fig. 1.

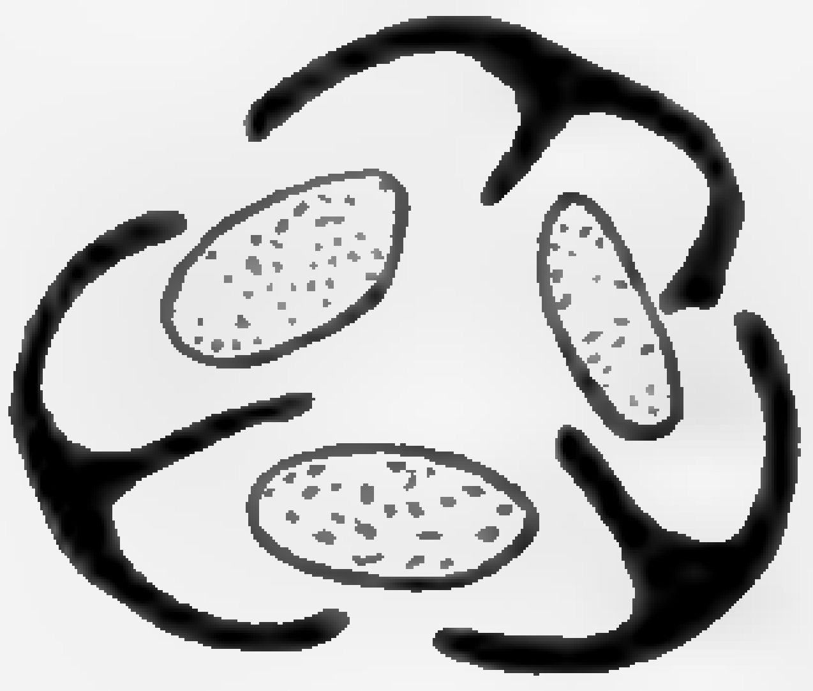


Fig. 2.

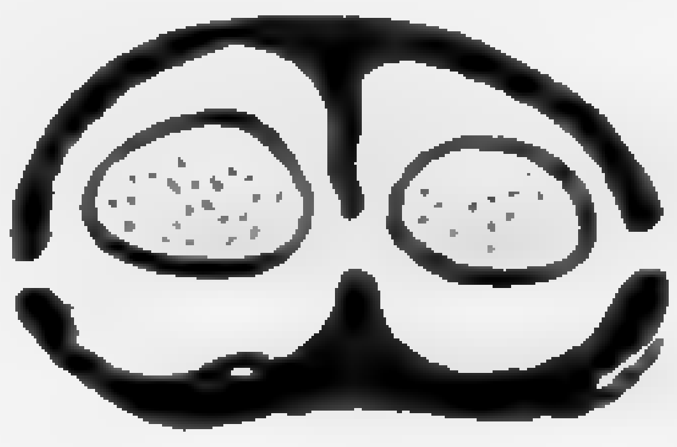


Fig. 3.

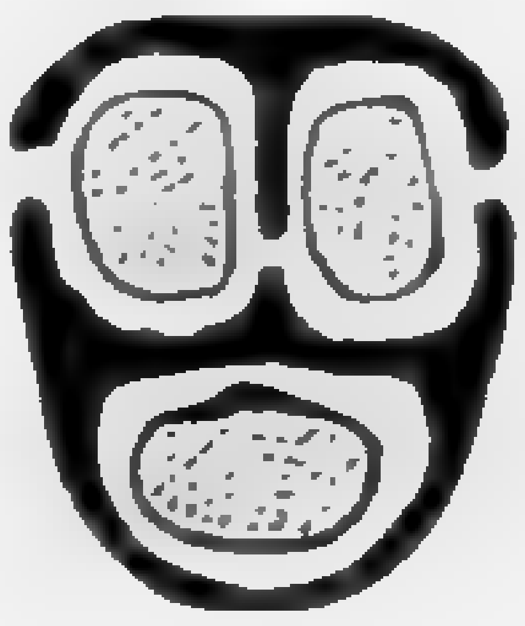


Fig. 4.

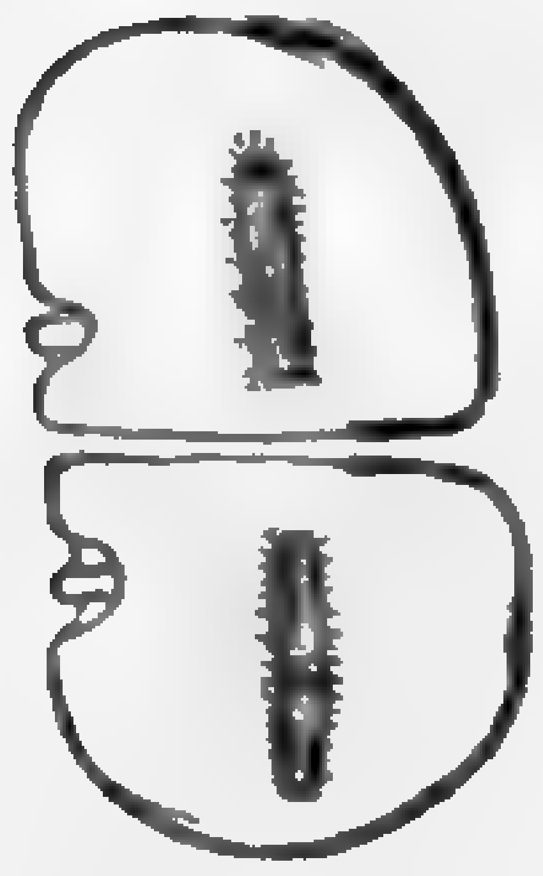


Fig. 5.

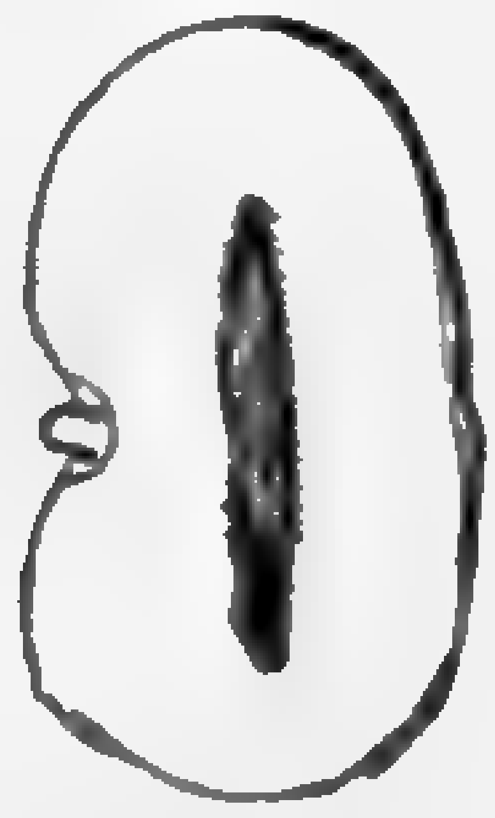
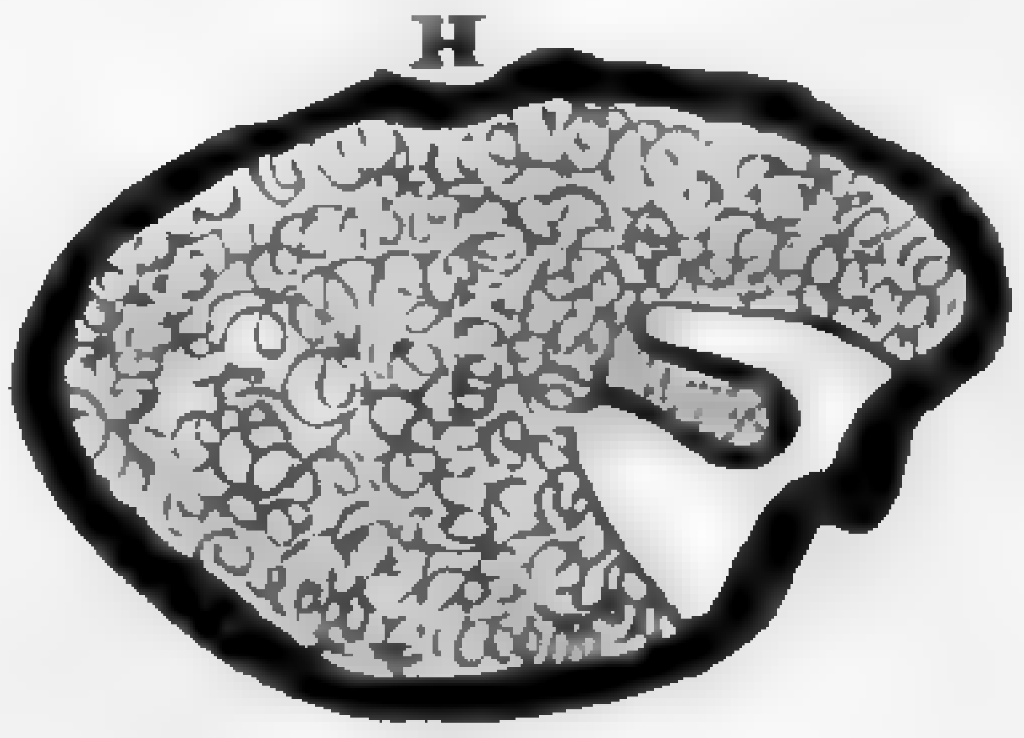


Fig. 6.



DESCRIPTION OF THE WOODCUTS.

Fig. 1. Horizontal section of capsule of *C. obliqua.*
2. „ „ *C. rugulosa.*
3. „ „ *C. communis.*
4. Two small seeds from one of the dehiscent cells of *C. salicifolia.*
5. Large seed from the indehiscent cell of *C. salicifolia.*
6. Horizontal section of a seed of *C. obliqua* perpendicular to its axis and through the embryo. H the hilum.

Sect. I. *a.*

1. **Commelyna communis**, *Kunth, l. c.* p. 36.—C. cæspitosa, *Roxb. Flor. Ind.* i. p. 174.

Folia subglabra, oblonga, acuminata. Spathæ complicatæ, cordatæ, acutæ, sparsæ. Semina 5, reticulata.

Hab. in Bengalia ubique.

Lower pedicel with one or sometimes two flowers, occasionally bearing no flower. Upper pedicel with from two to four flowers. The innermost flower on the upper pedicel has an ovary, all the others being generally male; and hence there is generally but one capsule to each spathe. The lower pedicel nearly always carries male flowers only; but rarely I have seen a capsule on the lower pedicel, and once two capsules.

The *C. communis* of Roxb. is certainly (*vide infra*) the modern *C. obliqua*; and I judge, from his figure (t. 1307, in the Calcutta Herbarium) of *C. cæspitosa*, that Roxb. so named our *C. communis*, though it is strange that he should give Chittagong as the only locality for it. Bth., in 'Hongkong Flora,' p. 376, reduces *C. cæspitosa*, Roxb., to *C. salicifolia*, with a query. It is not *C. salicifolia*; and it would be very remarkable if Roxburgh overlooked altogether so common a plant as *C. communis*.

2. **Commelyna salicifolia**, *Kunth, l. c.* p. 39; *Roxb. Flor. Ind.* i. p. 172; *Roxb.* t. 1020, *in Calc. Herb.*

Folia subglabra, anguste oblonga. Spathæ complicatæ, basi cordatæ, longe acuminatæ, præcipue subterminales. Semina 5, lævia.

Hab. in Bengalia ubique.

Lower pedicel with one or two male flowers. Upper pedicel with from 3 to 5 flowers; of the inner, two usually are perfect; hence generally there are two capsules in each spathe.

This species has much larger flowers than *C. communis*; when it gets among grass or bushes it becomes subscandent, and throws out little branched succulent stems, running 6 feet or more. Bth., in 'Hongkong Flora,' p. 376, and Thwaites, in

'Ceylon Enumeration,' p. 321, lay stress on the shape of the odd petal in this species in separating it from *C. communis*; I believe the seeds are infallible.

Dr. Hasskarl, in 'Plantæ Junghuhnianæ,' p. 136, reduces this species to *C. agraria.* Apart from the decisive differences in the seeds, the whole aspect and habit of *C. salicifolia* is so remote from that of *C. agraria* that I do not think Dr. Hasskarl can ever have seen *C. salicifolia.* At the same place Dr. Hasskarl has done his best to involve *C. communis* also in inextricable confusion: he says, '*C. communis* differt foliis elongato-acuminatis, supra scabriusculis, pedunculo altero 2–3- (nec 3–4-) altero subuni- (nec 2-) floro, floribus omnibus hermaphroditis;" a description that does not apply to 1 per cent of the Bengal *C. communis*, and in which he appears to me to have almost perversely fixed on the most variable characters in the order, while omitting all reference to the capsule and seeds.

*2. COMMELYNA SALICIFOLIA β. MONOSPERMA. Semen unicum.

Hab. in sylvis Mudhopoor prope Daccam.

The seed perfected is one of the upper ovules in one of the 2-ovuled cells. In the ripe fruit the three cells and four aborted ovules are easily seen. The capsule is necessarily quite altered in shape from the ordinary *C. salicifolia* capsule; and, moreover, in my specimens the innermost flower on the lower peduncle had an ovary which I have never seen in *C. salicifolia*, though it is very likely to occur. The flowers in my specimens were white, and the spathes had at the lower end on the inside long white hairs. I only found it, on one occasion, in a remote place, and arrange it as a variety of *C. salicifolia.* It is an interesting variety as helping us to a due appreciation of the genus *Heterocarpus* of Wight.

3. COMMELYNA BENGALENSIS, *Kunth, l. c.* p. 50; *Roxb. Flor. Ind.* i. p. 171; *Roxb.* t. 1019, in *Calc. Herb.*; *Wight, Icones,* t. 2065.

Folia pilosa, ovato-elliptica. Spathæ cucullatæ, turbinatæ, sparsæ. Semina 5 rugoso-punctata.

Hab. in Bengalia ubique.

Lower peduncle usually with one male flower; often the peduncle is rudimentary, sometimes entirely wanting. Upper peduncle very constantly with two perfect flowers, producing two capsules on each spathe.

Out of eight (and three more dubious) species of *Commelyna* given by Miquel in 'Flora Bataviæ,' iii. p. 531, only in this species does he describe the capsule or seeds; and he states of *C. bengalensis*, "Capsula 3-locularis, loculo uno minore, omnibus dispermis." I should very much like to see a specimen of *C. bengalensis* (or of any other species of *Commelyna*) which exhibits a 6-seeded capsule.

C. cœlestis, cultivated at Darjeeling, has spread much from gardens at an altitude of from 7000 to 8000 feet, and looks as if it could maintain itself.

Sect. I. *b*.

4. **Commelyna kurzii**, n. sp.

Folia anguste lanceolata, cum spathis villosa-hirsuta. Spathæ complicatæ (at breves subcucullatæ), subterminales aggregatæ. Semina 3, lævia.

Hab. in collibus Rajmahl ad 500 ped. alt.

Several capsules are commonly perfect on each spathe.

5. **Commelyna rajmahlensis**, n. sp.

Subglabra. Folia oblonga. Spathæ complicatæ, sparsæ. Semina 3, lævia.

Hab. in collibus Rajmahl ad 500 ped. alt.

One capsule is commonly perfected on each spathe.

This species, with the preceding, was discovered by Mr. Kurz in the Rajmahl Hills, and, from the character of the section viz. "3-seeded 3-celled capsules with one closed cell," can hardly be mistaken for any thing else. It is, however, quite possible that the present plant (*C. Rajmahlensis*) is what Dr. Wight has figured (Icones, t. 2067) as *Heterocarpus glaber*. It is not unlikely that two out of three ovules are sometimes aborted (as in my *C. salicifolia β. monosperma*), or that Dr. Wight may not have had perfect specimens.

Sect. II.

6. **Commelyna obliqua**, *Don.*—C. polyspatha, *Wight, Icones*, t. 2066.—C. paleata, *Hasskarl in Plantæ Junghuhnianæ*, p. 139.—C. communis, *Roxb. Flor. Ind.* i. p. 171; *Roxb.* t. 1018, *in Calc. Herb.*

Folia elliptico-lanceolata. Spathæ cucullatæ turbinatæ (at plus minus secundæ et uno latere producto-acutæ), subterminales aggregatæ. Semina 3 aut 2 lævia.

Var. *α*. genuina. Semina 3. Spathæ cum foliis subglabræ.

Var. *β*. viscida. Semina 3. Spathæ rubro-viscido-pilosæ. Imo tota planta viscosissima manibus hærens.

Var. γ. PALUDOSA, *Hassk.* Semina 2. Spathæ cum foliis subglabræ.
Hab. α in Bengalia ubique; β in collibus Khasiyæ ad 3000–5000 ped.elev., in jugo Himalayensi ad 4000–8000 ped. elev.; γ in Delta gangetica.

Lower peduncle often suppressed. Upper peduncle with from 3 to 5 flowers, of which the two inner at least are fertile. Plant generally large, with leaves 4–6 inches long; but I have met with very small specimens in the Himalaya at 5000 feet elevation.

As to the synonymy, the figure of Wight shows the capsules and seeds, which he also describes, and there can be no doubt that his *C. polyspatha* is the *α. genuina* form of the old *C. obliqua.*

Dr. Hasskarl's laboured description of his *paleata* is much of it wholly vain; but it contains a description of the capsule and seeds, which makes me feel sure of the plant, though the whitening of the edges of the seeds does not, as might be inferred from Dr. Hasskarl's language, take place at the hilum. Moreover it appears from the 'Regensburg Flora,' no. 14, 1866, that Dr. Hasskarl has since discovered the identity of his *C. paleata* with *C. polyspatha* of Wight, though he does not appear to have heard of the old *C. obliqua.*

Finally, as to the synonymy. *C. communis* of Roxburgh:—one glance at his figure, t. 1018, in the Calc. Herbarium is sufficient; the figure is characteristic and unmistakable; and he gives separate detailed drawings of the capsules and seeds. He says (Flor. Ind. i. p. 171) that his *C. communis* has the leaves with "delicate parallel veins running lengthways on the underside," also that "the spathes are terminal or subfascicled semicordate;" also that the next species, *C. bengalensis,* is "much smaller" than his *C. communis,* can be no other than our *C. obliqua.* *C. obliqua* is an abundant weed in this Botanic Garden, and is known to this day among the native gardeners by the traditional name of *C. communis.*

Next as to the varieties:—

β. viscida. The common typical Khasiya form of this is exceedingly unlike my *α. genuina*; but I find from the specimens issued from Kew that it has been reduced as a variety of *C. obliqua.* From the Himalaya a completely graduated series of specimens varying in hairiness can be obtained; and I believe that the hand which reduced it at Kew was an able and judicious one.

γ. paludosa. Vide Hassk., in 'Plantæ Junghuhnianæ,' p. 137, who says that the flowers are exactly those of *C. paleata,* that the ripe fruit is wanting, but that the immature fruit is 3-celled. I have authorized Java specimens in which the fruits (very nearly ripe) are all 2-celled. Dr. Hasskarl says that his *C. paleata* has the fruits 3-celled, but sometimes by abortion 2-celled. Thwaites in 'Ceylon Enumeration,' p. 322, has already given *paludosa* as a synonym of *C. obliqua.*

I have in my own collection a specimen (and I have met with many other examples) on which nearly all the capsules are 2-celled, but a few are 3-celled.

The question is very difficult; and Dr. Hasskarl may be right in thinking that *C. obliqua* is always 3-ovulate; but that would be very difficult to prove.

Finally, *C. paludosa* appears to me identical with *C. obliqua*, except in the number of the seeds: there are intermediate specimens varying in the number of seeds; and whether species or variety it grows pretty frequently in the southern portion of the Gangetic delta.

7. COMMELYNA SIMSONI, n. sp.

Folia subglabra, lanceolata. Spathæ cucullatæ, turbinatæ, subterminales, adgregatæ. Semina 2, lacunoso-punctata.

Hab. in sylvis Mudhopoor prope Daccam.

Lower pedicel quite rudimentary in all my numerous specimens; upper with from 3 to 8 (and even 16) flowers, of which several are perfect, and produce capsules.

A large plant, exceedingly like *C. obliqua γ. paludosa*; it has white flowers, and all the expanded perfect stamens have yellow anthers; but the only mark of value lies in the large shallow pits on the seeds.

[Name given in honour of the present Commissioner of Dacca, an excellent naturalist.]

8. COMMELYNA RUGULOSA, n. sp.

Folia subglabra, lanceolata. Spathæ complicatæ, cordatæ, breves, acutæ, sparsæ. Semina 2, grosse punctata, quasi rugosa.

Hab. in sylvis Terai dictis prope basin Himalayæ ad 1000 ped. alt.

Lower pedicel obsolete. Spathes small, usually containing one large capsule. Peduncles with several long lanceolate bracts.

This species has been collected also in Pegu by Mr. Kurz.

ANILEMA, *Kunth, Enum.*

Stamina 6, vel 5, 4; quorum 3 aut 2 perfecta similia, cætera sterilia difformia. *Pedunculi* ramosi, ad dichotomas bracteati. *Capsula* regulariter trilocularis.

Sect. I. Ovula 9 vel plura. Semina (nisi casu) 9 vel plura.
Sect. II. Ovula 6. Semina (nisi casu) 6.
Sect. III. Ovula 3. Semina (nisi casu) 3.

This genus is generally easily distinguished from *Commelyna* by the inflorescence being subpaniculate, and the pedicels being entirely exserted from the bracts at the branching of the panicle. But Mr. Kurz has lately collected in Birma a remarkable *Anilema* with two perfect stamens (and moniliform hairs on the filaments), in which the bracts are subcucullate and the pedicels subincluded therein. Perhaps the only absolute distinction remaining between the two genera is that in *Anilema* the stamens are either two or, if three, then the middle one has not larger anthers than the others. However, the only *Commelyna* (known to me) that has a regular trilocular capsule, viz. *Comm. obliqua*, differs widely in its bracts and inflorescence from all the 3-seeded *Anilemæ*.

In the 3-stamened species of *Anilema* there are often only three, sometimes only two, sterile difformed stamens; but in larger specimens of the same species sometimes four sterile stamens are seen. So in the 3-stamened species the sterile stamens are often two or three on the same panicle. The pains often taken in describing these sterile stamens seems to me ill-bestowed.

The number of perfect stamens in each species is tolerably constant. Thus *A. herbaceum* has generally three perfect stamens; but occasionally it has the middle one of these three smaller than the other two, and sometimes this middle stamen is altogether absent. So, in *A. protensum*, the fertile stamens are normally three, but not infrequently two only.

In specific distinction, stress is laid on "filamenta barbata" as opposed to "filamenta imberbia." These moniliform hairs often are very difficult to find in the bud, being developed greatly at the time of expansion of the flower. But, further, though they are generally characteristic of *A. herbaceum*, I have found fully opened flowers of *A. herbaceum* without a trace of these hairs. So R. Brown assigns to *A. vaginatum* bearded filaments (as I have always seen them), whereas Wight found them beardless, though it is clear from his figure that he had got the true plant.

On the whole, I find that (as in *Commelyna*) the ovules and seeds supply the most constant characters.

Sect. I.

1. **Anilema scapiflorum**, *Wight, Icones*, t. 2073.—Commelyna scapiflora, *Roxb. Flor. Ind.* i. p. 175, & t. 1521, *Calc. Herb.*—Anilema tuberosum, *Hamilt. in Wall. Cat.* n. 5207.—Murdannia scapiflora, *Royle, Illust.* t. 95.

Folia ensiformia, subglabra, omnia radicalia. Scapa radicalis; panicula robusta. Stamina 3 perfecta. Semina 15–21, angulata, dorso lævia.

Hab. in sylvis Mudhopoor ad Daccam.

The root is more or less bulbous, whence Hamilton's name.

The scape is 12–18 inches high, and, as Roxb. states, "leafless, invested at each of the remote joints with a small solitary sheath." The leaves Roxburgh states to appear after the flowering is completed; but they are often simultaneous at Dacca. The seeds are peculiarly columnar, and unlike those of all the other Bengal Anilemas by the absence of punctulation or reticulation.

A. Lourerii, Hance, in Seeman's 'Journal of Botany,' 1868, p. 250, is different, not merely by the stamens, but by the seeds.

The plant distributed from Kew as *A. scapiflorum* is referred, in this paper, to *A. herbaceum*; it is, at all events, quite unlike the true *A. scapiflorum*; and the Ceylon plant in Thwaites's 'Enumeration,' p. 322, is therefore not *A. scapiflorum*, Wight.

2. ANILEMA HERBACEUM, *Kunth, l. c.* p. 66.—Commelyna herbacea, *Roxb. Flor. Ind.* i. p. 175, & t. 1770 *in Calc. Herb.*—Anilema lineolatum, *Hasskarl in Plant. Junghuhn.* p. 146.—A. elatum, *Dalzell in Hook. Journ. Botany,* iii. p. 137.—A. latifolium, *Wight, Icones,* t. 2072.

Suberectum, robustum. Panicula subterminalis. Stamina 3 (rarissime 2) perfecta. Semina 9–15 (ad 21 ex Rxb.), punctata, subrugosa.

α. GENUINA. Folia subglabra, fere semper utrinque angustata, sæpe albo-marginata. Panicula elongata, ramis robustis. Capsulæ magnæ, margaritaceo-chartaceæ. (Huc synon. citata referunt.)

β. DIVERGENS (SCAPIFLORUM, *Hk. & Th.*). Folia lineari-lanceolata, basi vix angustata, plus minus pubescentia. Panicula quam in α multo tenuior, sæpe depressa subcorymbosa. Capsulæ minores, vix margaritaceæ.

γ. VISCIDA. Folia lanceolata, utrinque angustata, pubescentia. Ochreæ vix ullæ. Panicula viscida, pedicellis ceraceo-albis.

Hab. in montibus commune, Himalaya ad 500–8000 ped. alt.; Khasiya ad 500–5000 ped. alt.; β in collibus Khasiya ad 5000–6000 ped. alt.; γ ad radices collium Khasiya.

The typical plant, α. *genuina*, has the stems somewhat thickened at the joinings; it is a well-marked plant, and I feel pretty sure of the synonym adduced of Dalzell from his description only. Of *A. lineolatum*, Hasskarl, I have seen authorized Java specimens, and there can be no mistake.

β. *divergens* is the plant distributed by Hook. & Th. for *A. scapiflorum*, Wight, to which it bears no resemblance; but I think it is very probably a good species. I have placed it as a variety, from my inability to seize on tangible distinctions. The leaves in α are not always definitely narrowed at the base. The bracteolæ at the base of the pedicels in β are often linear; but they vary, and are sometimes as short ovate as in α.

γ. *viscida* I only met with once, in a shady ravine; but Dr. Hooker tells me he has met with exactly the same plant in the Khasiya Hills. I suspect it is but a variety due to local influences.

3. Anilema nanum, *Kunth, l. c.* p. 65; *Wight, Icones,* t. 2077.—Commelyna nana, *Roxb. Flor. Ind.* i. p. 173, & t. 1107 *in Calc. Herb.*

Repens, ramosum. Folia oblonga, basi haud angustata, subglabra. Paniculæ terminales. Stamina 3 perfecta. Semina 9–18, punctata.

Hab. in Bengalia ubique.

A. paniculata, Wight, 'Icones,' t. 2075, is a good picture of a very common form of *A. nanum*; and his *A. pauciflorum,* 'Icones,' t. 2077, though specially stated to be very distinct, would be named *nanum* by me.

A. canaliculatum, Dalzell, in Hook. 'Journal Botany,' iii. t. 137, appears to me a very accurate description of *A. nanum.*

Sect. II.

4. Anilema nudiflorum, *Kunth, l. c.* p. 66.—Commelyna nudiflora, *Roxb. Flor. Ind.* i. p. 173, & t. 1108 *in Calc. Herb.*

Repens, ramis erectis. Folia lineari-lanceolata, subglabra. Paniculæ terminales. Capsulæ chartaceæ, brunneæ, approximatæ. Stamina 2 perfecta. Semina 6, punctata.

Hab. in Bengalia ubique.

This common species varies from 3 to 18 inches in height, some of the hill large specimens being very near *A. ensifolium.* Nevertheless several species have been intercalated between the two by Hasskarl and others. In the whole of the laboured descriptions of *A. foliosum, A. radicans,* and *A. diversifolium,* by Hasskarl in 'Plantæ Junghuhn.' pp. 142, 144, there is nothing to show that they are other than the forms classed here as varieties of *A. nudiflorum.*

A. terminale, Wight, 'Icones,' t. 2076, is another plant which I should refer to *A. nudiflorum* (assuming the picture 5, giving a horizontal section of the capsule, to be wrong).

5. Anilema ensifolium, *Wight, Icones,* t. 2074.—A. loriforme, *Hasskarl in Plantæ Junghuhn.* p. 143, ex descript.

Erectum, robustum. Folia linearia, subglabra. Paniculæ terminales. Capsulæ plumbeo-lucidæ, remotæ. Stamina 2 perfecta. Semina 6, punctata.

Hab. in collibus Khasiya ad 3000–5000 ped. alt.

The capsules and seeds are larger those of *A. nudiflorum.* The lower flowers on the branches of the panicle are usually barren; in fruit the branches are thickened, recurved, clothed below with the imbricated empty bracts of the barren flowers, and terminated each by one or two capsules.

Nevertheless the hill varieties (*mihi*) of *A. nudiflorum* are so very close that I can only separate them by the capsule, which, in this species, becomes finally of a slaty lustrous appearance.

A. secundum, Wight, 'Icones,' t. 2075, is one of the forms which come in between this species and the large *A. nudiflorum*; Wight does not mention the lustre of the capsules; but from the figure I guess it to belong to *A. ensifolium*. So Thwaites considers it, 'Ceylon Enumeratio,' p. 322.

Sect. III.

6. ANILEMA VAGINATUM, *Kunth, l. c.* p. 67; *Wight, Icones*, t. 2076. —A pauciflorum, *Dalzell in Hook. Journ. Bot.* iii. p. 136.

Suberectum, filiforme. Folia linearia, subglabra. Paniculæ terminales lateralesque depauperatæ, 1–5-floræ, basi vagina subcylindrica involucratæ. Stamina 2 perfecta. Semina 3, rugulosa, punctata.

Hab. in oryzetis Bengaliæ orientalis.

Sometimes 18 inches high, more commonly 6 to 9 inches, and the panicle reduced to a solitary capsule.

Dalzell states that his *A. pauciflorum* only differs from *vaginatum* in having three seeds. But *A. vaginatum* always has three seeds. + K

7. ANILEMA PROTENSUM, *Wall. Cat.* n. 5218.—Dictyospermum protensum, *Wight, Icones*, t. 2071.

Suberectum, ramosum, viscosum. Folial anceolata, subglabra. Paniculæ terminales, subumbellatæ. Capsulæ viscoso-pilosæ. Stamina 3 perfecta. Semina 3, rugosa, punctata.

Hab. in montibus commune; Himalaya, ad 3000–8000 ped. alt.; Khasiya, ad 3000–5000 ped. alt.

POLLIA, *Kunth.*

Aclisia et Lamprocarpus, incl.

Semina 6, quorum 3–6 fertilia. *Capsula* plumbeo-cærulescens, trilocularis, vix dehiscens, irregulariter rumpens. *Semina* 6–10 in quoque loculo, subbiseriata. *Panicula* terminalis.

The fruit, when fresh, is a brilliant blue, and at a distance appears a berry; on closer examination it is found that there is no pulp, but that the texture is chartaceous; the capsule is ovate-globose, and is marked longitudinally with the three lines along which it imperfectly dehisces. The genus *Lampocarpus*, Bl., is therefore bad; and, indeed, the single species on which it is founded, *L. thyrsiflorus*, seems to me very doubtful, it is exactly like the common *Pollia indica*, but has the panicle closer; the denseness, however, of the panicle in *Pollia* seems very variable.

The genus *Aclisia* has already been reduced to *Pollia* by Bth., in 'Flora Hongkong,' p. 377; and the single species on which it was founded is, I believe, a mere variety of the common *Pollia indica.* The genus is reestablished by Hasskarl, in 'Regensburg Flora,' no. 14, 1866, though he gives no fresh characters to separate it; that residing in the number of the fertile stamens has been considered unsatisfactory by Bentham, and has been already discarded by Dr. Hasskarl in 'Plantæ Junghuhn.' p. 148.

1. **Pollia indica,** *Thwaites, Ceylon Enum.* p. 323.—P. japonica, *Kunth, Enum.* i. p. 75.—P. sorrogonensis, *Bth. Flor. Hongkong,* p. 377.—P. aclisia, *Hasskarl in Plant. Junghuhn.* p. 148.—Aclisia indica, *Wight, Icones,* t. 2068.—A. sorogonensis, *Kunth, l. c.* p. 74 (*verisimiliter* P. elegans, *Hasskarl inPlant. Junghuhn.* p. 149; Lamprocarpus thyrsiflorus, *Kunth, l. c.* p. 76).

Folia lanceolata basi, in ochream angustata. Panicula exserta, pilosa, elongata, ramis rigidis rectis.

α. Aclisia, sp. no. 1. Stamina 3 perfecta.

β. Aclisia, sp. no. 2. Stamina 4–6 perfecta.

Hab. *α* & *β* in montibus communis; Himalaya, ad 500–4000 ped. alt.; Khasiya, ad 500–4000 ped. alt.

The number of stamens in *β* varies from 4 to 6 in the same panicle; but it is very remarkable that, in the large number of 3-stamened specimens which I have examined, I have never found the perfect stamens variable. Except in this particular, even Hasskarl admits *α* & *β* to be identical.

I have no authorized specimen of *Pollia* (*Anilema*) *didyma*, said to grow in the Khasiya hills; but if it only differs from *P. indica* in the particulars mentioned by Benth. 'Flor. Hongkong,' p. 378, it is not likely that I shall ever discover it. The degree to which the leaves of *P. indica* are narrowed at the base, is sufficiently variable.

2. **Pollia subumbellata,** n. sp. Aclisia, sp. no. 3.

Folia obovata, lanceolata. Panicula subglabra, haud exserta, depressa, subumbellata, ramis cernuis.

Hab. in convallibus montium frequens; Himalaya, ad 1000 ped. alt.; Khasiya, ad 1500 ped. alt.

DITHYROCARPUS, *Kunth, Enum.*

Stamina 6 perfecta. *Panicula* terminalis. *Capsula* bilocularis. *Semina* 2.

1. **Dithyrocarpus paniculatus,** *Kunth, l. c.* p. 79.—Floscopa paniculata, *Bth. in Flora Hongkong,* p. 377, *cum syn. Indicis.*

Folia lanceolata, plus minus pilosa. Panicula plus minus rufescens,

pilosa. Semina "incano-cærulea, altero latere circa hilum radiatim sulcata, altero latere longitudinaliter plicato-sulcata" (*Hassk.* bene).

Hab. in montibus ad 500–7000 ped. alt., etiamque planitie Bengaliæ orientalis.

CYANOTIS, *Kunth, Enum.*

Stamina 6 perfecta. *Flores* in axillis foliorum congesti aut in scorpioideis racemulis intra bracteas geminatas nidulantes. *Corolla* monopetala. *Capsula* trilocularis. *Semina* 6.

1. CYANOTIS AXILLARIS, *Kunth, l. c.* p. 105; *Bth. in Flora Hongkong,* p. 378.—Tradescantia axillaris, *Roxb. Flor. Ind.* ii. p. 118, and *Coromandel Plants,* t. 107.

Folia linearia. Flores in axillis foliorum, 1–6, subsessiles, cærulei, albi aut purpurei. Semina rugoso-punctata.

Hab. in Bengalia ubique.

2. CYANOTIS CRISTATA, *Kunth, l. c.* p. 102; *Wight, Icones,* t. 2082. —Tradescantia imbricata, *Roxb. Flor. Ind.* ii. p. 120, and t. 1130 *in Calc. Herb.*

Folia ovato-lanceolata. Racemuli scorpioidei, distantes, parum pilosi. Semina longitudinaliter striatula, in facie interiore quatuor magnis punctis notata.

Hab. in Bengalia ubique.

This species is well separated from all the neighbouring ones by the peculiar markings of the seeds.

3. CYANOTIS BARBATA, *Kunth, l. c.* p. 104.

Folia lineari-lanceolata. Racemuli scorpioidei, distantes, plus minus lanato-villosi. Semina rugoso-punctata.

Hab. in montibus communis; Himalaya, ad 500–8000 ped. alt.; Khasiya, ad 500–6000 ped. alt.

There are several described plants very near this species, to which I have given the name found in the Calc. Herb., and which is also the name issued from Kew. But I question whether a large reduction of species ought not to be made here.

C. barbata only differs from *C. fasciculata* (Bth., 'Flora Hongkong,' p. 378) in that it has less woolly hairs on the involucral bracts. Hence, according to Thwaites, Enumeration of Ceylon Plants, p. 323, *C. barbata* ought to be a synonym of *C. lanceolata*, Wight, Icones, t. 2085. But, on turning to this figure, I find that *C. lanceolata*, Wight, is a species with axillary inflorescence, and so also prove the specimens of *C. lanceolata* in this herbarium (Bot. Gard. Calcutta).

I suspect that *C. barbata* and *C. fasciculata* should be made varieties of one plant, and that then a long string of Wight's species should be reduced—probably *C. Lawiana* and *C. rosea*,

Wight, t. 2086, *C. sarmentosa* and *C. dichrotricha*, Wight, t. 2087, and *C. decumbens*, Wight, t. 2088. The colour of the flowers in *Cyanotis* varies from blue to purple on the same plant, and the colour of the hairs on the filaments is eminently variable.

4. CYANOTIS NODIFLORA, *Kunth, l. c.* p. 136.

Folia lineari-lanceolata. Racemuli scorpioidei, ad nodos dense congesti. Semina rugoso-punctata.

Hab. in Assam; in collibus Khasiya, ad 500–4000 ped. alt.

This plant has been issued from Kew as *Cyanotis*, sp. 17, and is no. 58 ex Herb. Hook. f. & Th. It has also frequently been collected in Assam. It agrees closely with a specimen of *C. nodiflora* from South Africa. It varies considerably in hairiness. Finally, I still doubt whether it should not be made, with *C. barbata*, a variety of *C. fasciculata*.

STREPTOLIRION, *Edgew.*

Volubile. *Stamina* 6 perfecta. *Paniculæ* quasi terminales, ad basin cordato-ovatis bracteis suffultæ. Capsula trilocularis. Semina 6.

1. STREPTOLIRION VOLUBILE, *Edgew.*; *Wight, Icones*, t. 2081.

Folia longe petiolata, cordato-ovata, acuminata. Bracteæ ad basin pedicellorum corolloideo-albidæ. Petala lineari-oblonga.

Hab. in jugo Himalayensi, ad 4000–9000 ped. alt.

FORRESTIA, *Kunth, emend.*

Stamina 6 perfecta. *Capsula* trilocularis, trivalvis, subirregularis. *Semina* 2–6. *Panicula* dense conferta, vaginam suam integram perforans.

Cf. Hasskarl in 'Regensburg Flora,' no. 40, 1864.

From a suggestive remark made to me in a letter by Dr. Hooker, I took an opportunity of carefully examining about 200 capsules and seeds of *Forrestia Hookeri*, when I lighted on it growing in quantity. I found nearly 75 per cent. of these capsules to contain five seeds; and they were constructed and arranged in all respects exactly as in the Sect. I. *a* of *Commelyna*, in this paper, almost the only difference being that the capsule, though irregular, was 3-valved. About 4 per cent. of the capsules were 6-seeded; and the remainder were 4-seeded and 3-seeded. But there was hardly a case of an aborted ovule in the whole 200 capsules. When the number of seeds was four, there were two loculi with one large seed in each, and one loculus with two superimposed small seeds in it, the small seeds differing from the large in shape and in the position of the embryo, exactly as in sect. I. *a* of *Commelyna*. The genus *Forrestia*, instead of being regarded as an outlying or questionable member of the order, thus comes exceedingly close to *Commelyna* itself.

1. **Forrestia hookeri**, *Hassk. l. c.*

Folia subtus glabrata, margine villoso-ciliata. Capsula trigona acutissima, ad apicem glabra, quam sepala demum multo longior.

Hab. in convallibus montium frequens ad 500–3000 ped. alt.; Khasiya; Sikkim; Assam.

2. **Forrestia glabrata**, *Hassk. l. c.*

Folia subtus glabrata. Capsula ovoidea, ad apicem pilosa, quam sepala ad apicem hirta demum multo brevior.

Hab. in convallibus montium frequens ad 500–3000 ped. alt.; Khasiya; Sikkim; Assam.

[*Flagellaria* is plentiful in East Bengal. *F. indica* and *F. angustifolia* are, I believe, one plant.]

Species recognoscendæ.—There are in the Calc. Herb. Wallichian specimens of a plant (the number unfortunately lost) which will form a new genus near *Anilema æquinoctiale*, Willd. The habit and panicle are those of *Anilema herbaceum*; but the capsules are 2-celled, with three seeds in each cell, flattened, elongate, and broader upwards, ending in two prominent angles.

Tradescantia tuberosa, Roxb. (Flor. Ind. iii. p. 119, & t. 108 in Coromandel Plants), is a species of *Cyanotis*, near *C. barbata*, Don, unknown to me. I have never visited the Mahanuddee country, whence it is probable Roxburgh obtained it.

Extract of a Letter from H. F. HANCE, Ph.D., to Dr. HOOKER, V.P.L.S.

[Read February 17, 1870.]

"Whampoa, October 14, 1869.

"LAST week I spent a day on the White Cloud (Pakwan) Hills, outside Canton; and, besides getting a lot of duplicates for distribution, found two good novelties—a very distinct new *Archangelica* or *Angelica* (I have not yet had time to make a very careful examination, but am almost sure the former), and a splendid new *Pygeum*, 70 feet high, with very glossy leaves and *acute* fruit. I slept at the Upper Monastery, and had a good scramble after plants. *Simplocus lancifolia*, S. & Z., was in flower; *Castanopsis chinensis* in young fruit; and I found, for the first time on my way out, *Carpesium abrotanoides*, a plant I had for years hunted for in vain. Here, as in Japan, it is ruderal. *Eriocaulon heteranthum*, *E. truncatum*, *E. Wallichianum*, *E. australe*, and *E. echinulatum* were all plentiful in flower, with *Isolobus radi-*

cans, and many *Gramineæ*. I have also got good fruiting specimens of my *Rhamnus oreigenes*, confirming my surmise that it belongs to the section *Frangula*. How wonderfully little has been done for the investigation of this flora (or, rather, had been, up to the appearance of the 'Flora Hongkongensis'), is convincingly shown by the fact that the hills here, on Dane's Island, where I now write, are quite covered, towards the summit, with *Apocopis Wightii*, Munro, *Aristida chinensis*, Munro, and *Eriachne chinensis*, mihi,—all three grasses only described within the last few years. The latter is the "*Aira* seminibus hirsutis, aristis terminalibus flore longioribus" of Osbeck's Travels, who gathered it here; and I find, from a note of Munro's in the 'Linnean Journal,' that he had named it in MS. *E. Hookeri*, you having found the same species in Chittagong. Yet, notwithstanding, this place has been for more than a century the anchorage of ships trading to Canton; and, in the E. I. Co.'s time, their vessels carried surgeons, some of whom must surely have had a predilection for botany. Again, the temple where I slept is only six miles outside the walls of Canton, and is often visited by pic-nic parties; and yet, though the small wood surrounding it has plenty of *Quercus fissa*, Champ., some *Castanopsis chinensis*, mihi, and two trees of *Liquidamber formosana*, mihi, about 80 feet high, none of these species were known a few years ago; and the *Pygeum* I spoke of at the commencement, together with my *P. phæostictum*, are to this day undescribed. Botanists, indeed, have every reason to be grateful to the founders of these monasteries; for it is around them alone that are found the remnants of the arboreous and frutescent vegetation of China, and of such portions of the herbaceous flora as demand shade and shelter as necessary conditions of existence. Meyen, in his 'Pflanzengeographie,' expressed his opinion that the hills here were originally thickly clothed to their bases with *Pinus*; and I suspect the real state of the case to be, that this tree occurred thickly towards the bases and along the lower slopes, scattered and isolated on the exposed flanks, whilst the inner converging slopes, running down ravines and sheltered from the violence of the winds, were occupied by *mixed* dense woods. At present the search for wood is so active, and every little shrub is so cut up, that the denuded hillsides give no juster idea of the original flora of China than a burnt moor would of our home vegetation. But I speak only of South China (which alone I know), and from direct personal observation.

Notes on some Algæ found in the North-Atlantic Ocean.

By G. Dickie, M.D., F.L.S.

[Read April 7, 1870.]

(With a Woodcut).

I am indebted to Captain Thomas Mitchell, commander of an Australian trader belonging to Aberdeen, for the materials which form the subject of this communication.

The specimens were preserved in weak spirit; and along with them I received the following notes, which deserve to be recorded.

"The contents of the bottle were collected in the North Atlantic on the 24th of November, 1867. At 11 A.M. on that day and till 3 P.M., over a distance of fourteen miles, the ocean was closely studded with the green substance. I never saw weed of any description in this part of the world before, although I have passed through nearly the same place more than thirty times. The position of the ship at noon was lat. 12° 0′ N., long. 21° 40′ W., the true bearings and distances of the following points of nearest land were:—Porto Prayo, Island of St. Jago, Cape-Verds, N.W. by N. ½ N., 112 miles; Cape Verd, Africa, N.E. by E., 288 miles; mouth of River Gambia, E. by N. ½ N., 290 miles; mouth of the River Jeba, inside the Bijouga Islands, 340 miles.

"I watched carefully during the time we were passing through this strange substance, and found that the breadth from N. to S. was more than twelve miles; it extended from E. to W. as far as the eye could distinguish. There were strong tide rips, during the time, from S.E. to N.W., following each other at the distance of half a mile.

"Considering our position, I concluded that the substance must have come from some part of the American continent or the West Indies within the influence of the Gulf-stream. It had probably been washed from some river or estuary by a flood, and subsequently carried by the southern branch of the Gulf-stream south of the Canary Islands, and then further southward by the African current to the place where it was found, probably passing between the Cape-Verds and the mainland. I came to this conclusion from the fact that currents along the west coast of Africa continually sweep round in the direction of the coast-line; at 300 miles from the mouth of any river on that coast, even in the event of a flood, the drifts could not have been so far seaward"*.

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* It may be worthy of notice, in reference to this, that the destructive hurricane in the West Indies occurred about the end of October.

The substance thus picked up by Captain Mitchell was in excellent condition, and, besides three Algæ, contained:—numerous fragments, more or less decayed, of wood both exogenous and endogenous; seedling plants several inches long, all with a pair of cotyledons, roots, and terminal bud, quite fresh; small fruits partially decayed, evidently 1-seeded legumes; intermixed were various microscopical Crustacea, and a common oceanic insect, one of the Hydrodromidæ, genus *Halobates*; on some of the pieces of drift wood were numerous elliptical ova of a deep orange-colour, mixed with which was growing the smallest of the three Algæ now to be described.

The largest and most abundant of the Algæ might be compared to pale green *fleece*; it evidently belongs to the family Ulvaceæ, different from any one known to me or described in any work to which I have access. It is a near ally to the plant described and figured in the 'Phycologia Britannica' under the name *Enteromorpha Ralfsii*, authentic specimens of which I possess.

The tubular frond is the main character of the genus *Enteromorpha*, hence the name; neverthess there are in the British list two usually included in that genus, although they are not tubular, viz. *E. percursa* and *E. Ralfsii*, the former having a flat frond, the latter being cylindrical.

Areschoug, in his 'Phyceæ Scandinavicæ Marinæ,' 1850, placed *E. percursa* in a new genus, *Tetranema*, characterized by a quadrangular frond, composed of four series of cells—a character, however, chiefly in the young plant, there being more than four in maturer age; this same plant has been placed by Kutzing in *Schizogonium*.

For the reason stated above, I consider that *E. Ralfsii* ought to be separated from *Enteromorpha*, and placed along with the new species in a genus which I propose to call *Kallonema*.

Genus KALLONEMA.

Character.—Fronds filamentous, simple or branched, solid and round, of four series of cells.

1. K. RALFSII, *Harv.* "Frond capillary, simple, or having few short spine-like ramuli" (*Phycologia Britannica*, pl. 282).

Loc. Sea-shore, Bangor, North Wales, *Mr. Ralfs*. Found also at Cherbourg by M. Le Jolis.

2. K. PELLUCIDUM, n. sp. Frond simple, subclavate upwards, rooting below.

Loc. Floating in masses, Atlantic Ocean, lat. 12° N., long. 21° 40′ W., *Captain Thomas Mitchell.*

The general colour is pale green; under the microscope the filaments are remarkably hyaline, the endochrome consisting of a few spherical granules grouped together in the centre of each cell; diameter of filaments about ·001 (a thousandth) of an English inch. The specimens were for the most part so matted and entangled, that in only a few instances could their form and length be seen; four short truncated rootlets, each of one row of cells, were observed at the base, the other extremity dilated and obtuse; length 1 to 3 inches.

Fig. 1 shows the general form of the entire plant; fig. 2, general appearance under the microscope; fig. 3, transverse section, to show the number of cells.

With respect to the true original habitat, I agree with Capt. Mitchell in the belief that the plant came in masses from some estuary, and the locality where it was found was merely accidental.

The other two plants associated with it belong, one to the genus *Spermosira*, family Nostochineæ, the other to *Schizosiphon*, family Rivulariaceæ. The former was free and mixed with the *Kallonema*; the latter was found in small quantity adhering to fragments of drift wood.

SPERMOSIRA ATLANTICA, n. sp. Spores subquadrate, single; vegetative cells mostly in pairs, plano-convex; persistent cells single, elliptical.

Loc. With *Kallonema.*

Usually eight pairs of vegetative cells and a solitary persistent cell intervene between each spore. The sheath is very translucent, but always sufficiently obvious under the microscope. The filaments have a diameter of ·0004 of an English inch, and therefore less than half that of *Kallonema.*

In the most recent authority known to me, viz. Rabenhorst's 'Flora Europæa Algarum,' which usually contains notes on extra-European species, there are four, described under two sections: the first includes those which have several spores in a series and usually no sheath, viz. *S. turicensis*, *S. Vriesiana*, and *S. litorea*; one form of the latter, however, has a sheath; under the second section, where the spores are single or rarely binary, there is one species, viz. *S. spumigera*, the spores of which are globose; the species now described is an addition to the second section, and distinguished by the form of the spores.

Fig. 4 shows part of a filament, highly magnified; two spores and the intervening cells above mentioned are represented.

Schizosiphon obscurum, n. sp. Filaments straight, shorter than the sheath, gradually attenuate upwards from the large subspherical basal cell, usually torulose throughout; sheath distinct, obscurely lamellose.

Forming a thin stratum on drift wood; filaments generally about ·004 of an English inch in length, but variable in that respect (Fig. 5).

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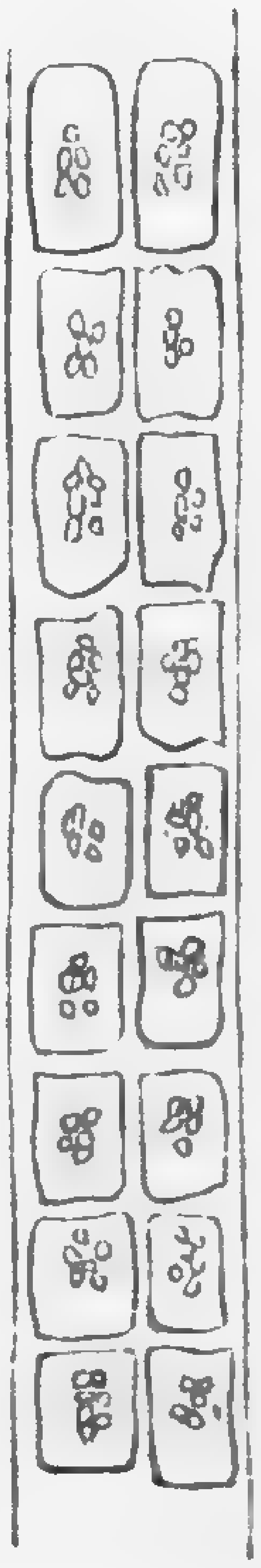

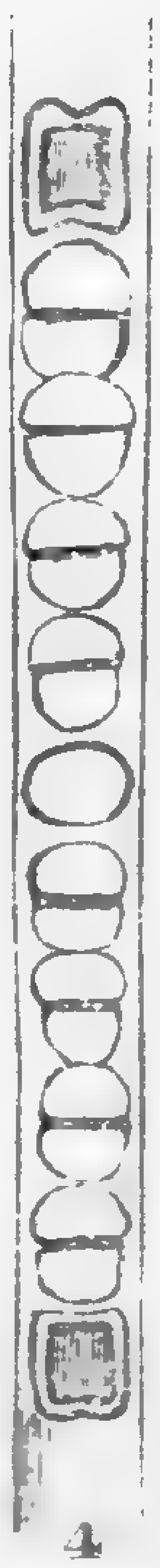
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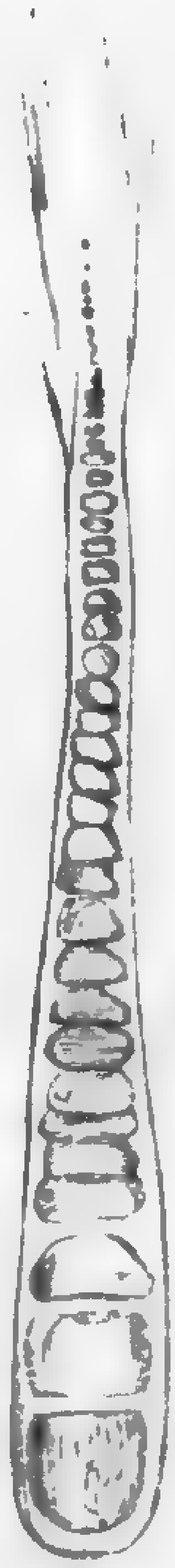
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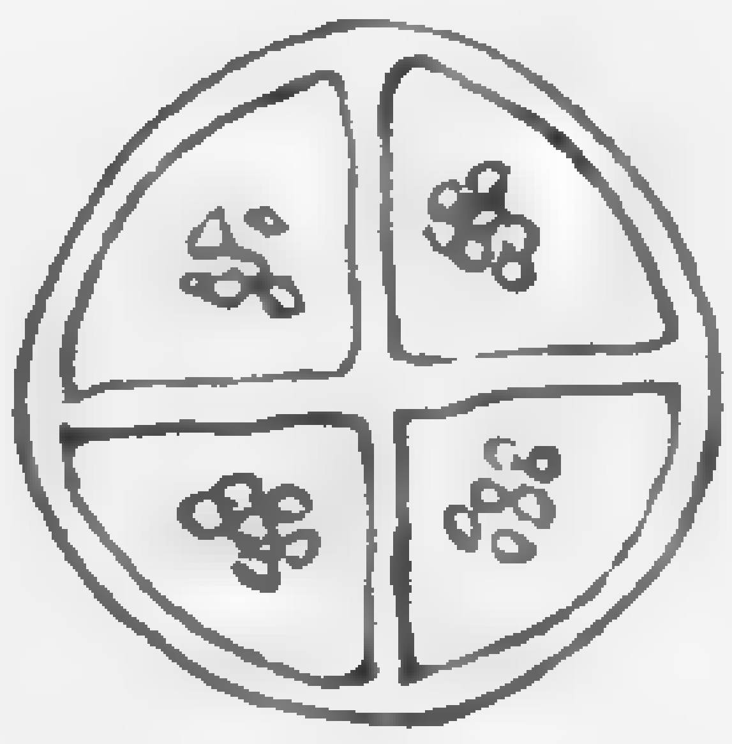
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Contributions to British Bryology. By S. O. LINDBERG, M.D., Professor of Botany at the University of Helsingfors, Finland. Communicated by J. D. HOOKER, M.D., V.P.L.S.

[Read January 20, 1870.]

I. On some *Andreææ*.

I have received for determination from Mr. G. E. Hunt some *Andreææ* with nerved leaves, which were only numbered; all these belonged to three species, viz.:—

1. ANDREÆA FALCATA, *Schimp., forma* minor.

Hab. Ben Voirlich, by Loch Lomond, in Scotland, July 1865 (*G. E. Hunt,* No. 4).

This species is easily distinguished from the following by its very falcate leaves, from a broad, nearly round and concave base, very abruptly narrowed into a distinctly repand subula, but resembles it in the not at all glossy black colour of the whole plant, and in the rather ill-defined nerve, occupying only the middle third of the subula. By these characters they are both well distinguished from the probably more common *A. crassinervia,* Bruch.

2. ANDREÆA ROTHII, *W.* & *M.* (A. rupestris, *Roth, Neue Beitr.* i. pp. 232–36, *excl. synon.* 1802).

Hab. North Wales, Capel Curig, July 1863 (*Whalley,* No. 6); Dewerstone rocks, Devon, May 1867 (*Holmes,* no. 8); Mazebeck Scars, Yorkshire, June 1856 (*J. G. Baker,* no. 10); Snowdon, Crib-y-Discl, June 1865 (*W. P. Schimper,* no. 14).

Var. GRIMSULANA, *C. Muell.* (A. grimsulana, *Bruch, MS.*).

Hab. Brandsby Falls, Yorkshire, May 1858 (*J. G. Baker,* no. 7).

3. ANDREÆA CRASSINERVIA, *Bruch* (*in Denksch. Akad. Münch.* 1828, p. 279. no. 1, tab. 10).

Hab. Lancashire, Staley Brushes, April 1864 (*Whitehead,* no. 1); Entwistle, December 1865 (*Whitehead,* no. 2); Snowdon, North Wales, May 1853 (*Nowell,* no. 5), August 1860 (*Whitehead,* no. 3); Hebden Bridge, Yorkshire, July 1865 (*Hunt,* no. 9); Soccoth Hill, Arrochar, June 1865 (*M'Kinlay,* no. 11); Loch Kandor, Aberdeenshire, July 1868 (*Hunt,* no. 12); Beddgelaert, North Wales, August 1860 (*Hunt,* no. 13).

Is easily distinguished from the foregoing by its being a more robust plant, somewhat glossy, and with the nerve much better defined, thicker and more prominent on the back, and also forming by itself the whole upper part of the subula. When it is desirable to get a clear view of the structure of the leaves of mosses and Jungermanniæ, especially about the nerve, the object should be placed in a drop of a strong solution of caustic soda, and, after a minute, washed in distilled water. By this means we obtain a perfectly transparent object, with a sharp contour, so necessary when we examine the *Andreææ nervatæ, Pleuridia, Ditricha* (*Leptotricha*), *Seligeriæ*, &c., whose leaves are often badly described in books.

II. *Pottia intermedia.*

This moss has been regarded by all recent authors as a variety of *P. truncatula*, but has some important characters, from which it must be considered a distinct species (*P. intermedia* (Turner), Fuernr.), intermediate between *P. truncatula* (L.), Lindb., and *P. lanceolata* (Hed.), C. Mül.

These characters are the size, the margin of the leaf more or less revolute up to the middle, the long, often cylindrical capsule, which is, when dry, indistinctly constricted below the narrower orifice, the rudimentary peristome, and the compound annulus closely adhering to the margin of the capsule.

P. truncatula is, compared with this, a smaller plant, with the leaves quite plane, and a short nearly globular capsule with wide mouth, which, in the dry state, is much constricted below the orifice, wanting also a peristome and annulus. *P. lanceolata* has a narrower mouth to the fruit, and a well-developed peristome. By the above characters *P. intermedia* bears to the other two species (*Desmatodontes*, Lindb.), the same relation that *Physcomitrium eurystomum* (a species probably occurring also in Britain) does to *Ph. sphæricum* and *Ph. pyriforme*,—differing from the former in its more robust habit, in the broadly lanceolate acuminate leaves, which are serrate, not concave, but canaliculate, with cells twice as long as broad, and by the obtusely conic lid; from the latter by its hemispherical capsule with very wide mouth, simple annulus, short lid, &c. As the synonyms of *Ph. sphæricum* and *eurystomum* are still very much confused, I add references which may aid in their extrication.

1. PHYSCOMITRIUM SPHÆRICUM (*Lud.*), *Brid.*

Gymnostomum sphæricum, *Ludw. MS.*; *Schkuhr, Deutschl. Moos.* p. 26. no. 15 (1810); *Schwgn. in Schrad. Jour. Bot.* ser. 2, iv. p. 15 (1810), *et Supp.* i. pt. i. p. 21. no. 6 (1811); *N. H. S. Bry.*

Ger. i. p. 124. no. 3 (1823); *Hübn. Musc. Ger.* p. 43. no. 9 (1833).

G. (Physcomitrium) sphæricum, *Brid. Bry. Un.* i. p. 97. no. 42 (1826).

Ph. sphæricum, *Brid. op. cit.* ii. p. 817 (1827); *Fürnr. in Reg. Bot. Zeit.* xii. pt. ii. *Ergänz.* p. 9 (1829); *Hampe in eod. diar.* xx. pt. i. p. 285. no. 1 (1837); *B. S. Bry. Eur.* fasc. ii. *Monog.* p. 10. n. 2 (1841); *C. Mül. Syn.* i. p. 115. no. 2 (excl. var. β?), 1848; *Raben. Deutsch. Krypt. Fl.* ii. pt. iii. p. 87. no. 6140 (excl. var. β?), 1848; *Wils. Bry. Brit.* p. 275. no. 4 (1855); *Schpr. Syn.* p. 314. no. 1, pp. (1860); *Berk. Handb. Brit. Moss.* p. 174. no. 1 (1863); *Milde, Bry. Siles.* p. 192. n. 1 (1869).

Anœctangium sphæricum, *Spreng. in L. Sys. Veg.* ed. 4, xvi. pt. i. p. 146. no. 2 (1827).

Delin.—*B. S. Bry. Eur.* fasc. ii. *Monog.* t. 1; *Eng. Bot. Sup.* iii. t. 2830; *N. H. S. Bry. Ger.* i. t. 9. fig. 3; *Schkuhr, Deutschl. Moos.* t. 11B; *Schrad. Jour. Bot.* ser. 2, iv. t. 2. fig. B.; *Schwgn. Sup.* t. 8; *Sturm, Deutschl. Fl.* fasc. ii. 15; *Wils. Bry. Brit.* t. 52.

2. PHYSCOMITRIUM EURYSTOMUM (*N. Es.*), *Sendt.*

Gymnostomum eurystomum, *N. Es. MS.*

Phys. eurystomum, *Sendtner in Denks. bot. Ges. Regen.* iii. p. 142, no. 2 (1841); *Milde, Bry. Siles.* p. 193. no. 270 (1869).

Ph. sphæricum, *B. S. Bry. Eur.* fasc. ii. *Monogr.* p. 10. no. 2, p. p. (1841).—*Schp. Syn.* p. 314. no. 1, p. p. (1860).—Var. β. caulescens, *C. Mül. Syn. Mus.* i. p. 115 (1848)?—*Rab. Deutsch. kr. Fl.* ii. pt. iii. p. 87 (1848)?—Var. cuspidatum, *D. M. in Prod. Fl. Cat.* ii. pt. i. p. 70 (1851).—Var. β. Hübeneri, *Rab. Kr. Fl. Sachs.* i. p. 368 (1863).

Ph. acuminatum, var. foliis distincte sed obtuse denticulis, *C. Mül. op. cit.* i. p. 115, *inter syn.*—Var. β. denticulatum, *Rab. Deut. kr. Fl. loc. cit.*

Ph. Neesii, *Sendtner, MS.*

Delin.—*Prodr. Fl. Cat.* ii. pt. i. tab. 2.

Exsic.—*Rab. Bryoth. Eur.* fasc. ii. no. 54, et fasc. x. no. 452.

III. *Tortula squarrosa.*

This species was first described under the name of *Barbula squarrosa* by Bridel in his 'Bry. Univ.' i. Sup. p. 833. no. 55? (1827); but as he had seen only sterile specimens, he was uncertain about the genus. Owing to the kindness of Prof. Al. Braun, of Berlin, I have been enabled to examine the original specimens of *B. squarrosa* in the collection of Bridel, bearing the inscription "*B. squarrosa.* Patria ignota, Herb. Cand. 1825." I can therefore positively confirm the judgment of Dr. C. Müller that it is the same species as *Tortula squarrosa*, De N.

The *Tortula* in question is highly interesting from its truly axillary fruit-stalk, not "lateral by the quick and continued growth of innovations," because the perichætia are, from the beginning, developed in the axils of the leaves, and not at the top of the stems; the bracts are also, as in pleurocarpous mosses, accrescent in size towards the middle of the perichætium. It must therefore be separated from the true acrocarpous Tortulæ, as a proper genus, *Pleurochæte*, Lindb. Œfv. V. Ak. Förh. xxi. p. 253. no. 9 (1864), possibly including also some other *Tortulæ* with serrated leaves, as *T. serrulata*, H. G., *robusta*, H. G., and *densifolia*, H. f. & W., which I have not yet seen. This genus thus bears to *Tortula*, Hed., the same relation as *Mielichhoferia*, *Leptochlæna*, and *Goniobryum*, Lindb. in op. cit. xxi. p. 606. no. 9, 1864 (*Photinophyllum*, Mitt. in Jour. L. Soc. x. p. 175, 1868), do to *Bryum*—*Anœctangium* to *Zygodon*—*Rhizogonium* and *Mesochæte** to *Mnium*—*Hymenodon* to *Georgia*—and *Rhacocarpus*, Lindb. in op. cit. xix. p. 607. no. 8 (*Harrisonia*, Schpr. 1860, but not R. Br. 1825), to *Braunia*, &c.

IV. *Trichostomum diffractum*, Mitt.

I have received from Mr. G. E. Hunt an English moss, called by Mr. Mitten *Trichostomum diffractum*, n. sp., and had previously the same form (gathered by Mr. Nowell) from R. Spruce, Esq., who has most generously favoured me with the half of his collection of European mosses. This specimen was thus labelled:—"Gathered with Mr. Wilson, who called it at first *Didymodon brachydontius*?"

The moss in question is, at first sight, easily recognized by the following characters:—The tufts are short, very dense, and nearly hemispherical, of black-green colour; the stems united below by masses of dark brown tomentum; the leaves closely crowded and fragile; in a dry state irregularly incurved, with a strong, whitish, very shining nerve, very prominent at the back, the large hyaline cells of the leaf-base not well defined in the centre from the upper small indistinct ones, but gradually becoming fewer as they ascend obliquely to end in the margin, precisely as we find the areolation in all the *Tortulæ tortuosæ*; and, indeed, it is no doubt most related to *Tortula inclinata*, Hed. f., but very distinct from it and all other species of the same group.

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* MESOCHÆTE, n. gen., *Lindb.* Perichætium axillare, bracteis accrescentibus. Capsula horizontalis, obliqua, pachydermis, jugata. Peristomium duplex, ciliis interni teneri maxime appendiculatis. Calyptra? Andrœcium gemmiforme, axillare.—Planta robustissima, elata, erecta, simplex, compressa; foliis quadrifariis, conformibus, obliquis, catilagineo-limbatis, cellulis minutis, rotuntis, lævissimis.

1. M. UNDULATA, n. sp., *Lindb.* Dioica, foliis undulatis.

Hab. in New England, inter 30–32° lat. aust., Australiæ medio-orientalis (New South Wales): hanc stirpem parce fructicantem misit cl. *F. von Mueller*.

It appears not to be rare (on limestone?) in the west and south of Europe, and North Africa, as the localities cited will prove, but has not yet been found in a fertile state.

TORTULA NITIDA, *Lindb.* Dioica, dense pulvinata; caule humili, rigido, ramoso, densifolio; foliis crassiusculis, fragililibus, erecto-patentibus, siccis arcuato-curvatis, plus minusve elongate oblongis, obtusis, canaliculatis, integerrimis, margine planis, paullo undulatis; nervo tereti valde crasso et dorso folii prominente, ut apiculo brevissimo excedente, sicco pallente, dorsoque nitidissimo; areolatione laxa basilari cuneiformiter in marginibus sensim desinente, cellulis cæteris indistinctis, minutissimis, verrucosis; bracteis perichætii foliis simillimis; pistillidiis et paraphysibus æquilongis, sat paucis.

Tortula nitida, *Lindb. Eur. Trichost.* p. 45. no. 46 (1864), et in *Œf. V. Ak. Förh.* xxi. p. 252. no. 46 (1864); *Rab. Hedwigia,* iv. p. 40 (1865).

Barbula Alexandrina, *Lor. in Abhan. Ak. Wis. Berl.* 1867, pp. 32–35. no. 13.

Trichostomum Barbula (*haud Schwg.*), *M. T. Lange in Bot. Tids.* ii. p. 235 (1868).

Barbula nitida, *Jur. MS.* 1867.

Trichostomum diffractum, *Mitten in Seem. Jour. Bot.* vol. vi. p. 97 (1868).

Delin.—*Seem. Jour. Bot.* vol. vi. tab. 77; *Abh. Ak. Wis. Berl.* 1867, tab. 6. figg. 1–6, et tab. 7. figg. 7–20.

Hab. Devonshire, Plymouth, &c., 1867, *Holmes, hb. Hunt*; Shoreham Beach, *Nowell, hb. Spruce*; Gibraltar, ♀, 1839, *Dr. A. F. Regnell,* July 1865, *M. Brenner*; Genoa, February 1867, *Dr. P. T. Cleve*; Pisa, S. Paulo, January (no. 29); Toscana, Ripafratta, February (no. 30), ♀; Prato, April 1862 (no. 31), *M. T. Lange*; Neapoli, March 1867, *P. T. Cleve*; Dalmatia, Porto Rosaria in the peninsula Sabioncello, December 1866, ♀, *Dr. E. Weiss.* (hb. Juratzka); Capo Græco, in Cyprus, April 1862, *Prof. F. Unger* (*hb. Jur.*); Egypt, near Alexandria, April 1823, *Prof. E. G. Ehrenberg* (*hb. Akad. Sc. Berlin*).

V. *Orthotrichum leiocarpum.*

In describing this species (Bry. Eur. fasc. 2 & 3, Monog. p. 28. no. 31, 1837) Messrs. Bruch and Schimper have written in a note (p. 29), "comme c'est la seule espèce du genre *Orthotrichum* qui ait la capsule dépourvue de raies, nous l'appelons *O. leiocarpum* (à fruit lisse) en rejetant la dénomination '*striatum*' qu'on avait conservée jusqu'ici."

This alteration of the specific name would be justified, if only the older authors, as Linné, &c., had really taken the denomination from the capsule; but this they have *not* done, giving the species its name from the striated veil. In all his works the great Linné says positively "calyptris striatis"—a character, indeed, rather common in the genus, but not to be altered when we retain e. g. *Carex paludosa*, Good., although nearly all sedges grow in bogs. We must therefore retain *Orthotrichum striatum* (L.) Smith, Fl. Brit. iii. p. 1262. no. 1 (1804).

VI. *Leucobryum glaucum.*

In 'Tr. Bot. Soc. Edin.' iii. p. 194. t. 12 (1849), the very acute observer, R. Spruce, first pointed out that there exist in the connate walls of the cells in the nerve of the leaf of *Leucobryum glaucum* large circular perforations; but he added that he was unable to find any holes on the surface of the leaf. And, indeed, the transparent margin of the base is constructed of only a single layer of cells, with so very thin a membrane, that without artificial help the pores in their outer walls are quite imperceptible. If we place the leaf for some minutes in a strong solution of caustic soda, then clean it scrupulously in distilled water, and lay it in a solution of superiodate of zinc + iodide of potassium (or of nitrate of silver; in which case the leaf must be dried in a dark place, and afterwards placed in full sunshine), we shall have an object with contour sharp enough to be observed under the microscope. We then find that the thin cells in the margin of the leaf-base have very large pores, sometimes two in the same wall, and occasionally divided by a very narrow bridge, formed by the membrane itself, into two holes. Their form depends upon the form of the cell itself, and is of course very variable, being round, oblong, lanceolate, reniform, &c. Very often the pores on the upperside of the leaf coincide with others on its underside, but never perfectly so—the one being larger than the other, and hence more easy to be seen. The pores observed not only on this beautiful moss, but also on other forms belonging to the same group, *Leucobryaceæ*, as also on different *Eucalyptæ*, *Syrrhopodontes*, *Calymperes*, &c., are not very like those on *Sphagna*, being of very irregular form, without any trace of a thickened circumscribing border, and are not found in every cell.

If we put the object between glasses in the same iodine solution, it will remain unaltered for several years. These observations have already been published in my essay on the Bog-Mosses (1862).

VII. The British *Dicranum strictum.*

I have received from Mr. Wilson a specimen of "*Dicranum strictum*=*D. thraustum*, Schpr. ?" gathered on old oak rails, Staffordshire, 1864, by Mr. Bloxam. This specimen belongs to a moss already named, in 1850, *D. thraustophyllum* (Musc. Pyren. No. 257, "wood between Pau and Gan") by the acute Mr. Spruce, and later, by Sullivant and Lesquereux, *Campylopus viridis*. It is exceedingly rare in fruit, this having been found only in Bavaria by Mr. Arnold (only one capsule), and in Finland by Dr. Norrlin (about twenty capsules). Its synonymy is as follows :—

DICRANUM VIRIDE (*S. L.*) *Lindb.*

D. thraustophyllum, *Spruce, MS.* 1850, *et Musc. Pyren. hb.* no. 257.

Campylopus viridis, *S. L., Musc. Bor. Amer.* ed. 1, no. 72 (1856), et ed. 2, no. 91 (1865); *Sull. Moss. U. S.* p. 103. no. 4 (1856), *et Ic. Musc.* p. 30 (1864).

D. viride, *Lindb. in. Rab. Hedwigia*, ii. p. 70 (1863), *et ejus Bryoth. Eur.* xxii. no. 1061 (1869); *Schpr. Musc. Eur. Novi*, fasc. 3 & 4. p. 1. n. 1 (1866); *Mild. Bry. Siles.* p. 65. no. 37 (1869).

D. fulvum* D. viride, *Lindb. in Hart. Sk. Fl.* ed. 9, ii. p. 68. no. 13*. (1864).

D. thraustum, *Schpr. MS.* 1862.

Delin.—*Schpr. Musc. Eur. Nov.* fasc. 3 & 4. tab. 1; *Sull. Icon. Musc.* tab. 18 B.

VIII. A British *Seligeria.*

Since the publication in 1860 of 'Synops. Musc. Eur.' by Prof. Schimper, in which important work four species of *Seligeria* are described, the genus has been enriched by no less than four new forms, all from the north of Europe—viz. *S. paucifolia* (Dicks.) Carruth., *S. diversifolia*, *S. crassinervis*, and *S. acutifolia*, Lindb.,—

the first from England, the others from Scandinavia. To these may be added a form of *S. trifaria* (Brid.), called by me var. *β. patula* in my essay on the Scandinavian *Seligeriæ*; Mr. Sullivant has given the same in his beautiful Musc. Alleg. ii. no. 142 (with a few individuals of *S. Donii* in a bad state), under the name of *Weissia calcarea*. It seems to be distinct from *S. trifaria* by its short stem with shorter setæ, and the leaves not trifarious, longer, recurved, thick, entire, and not pellucid, and by the large and thick nerve occupying nearly the whole subula. It may be a good species (*S. patula*, Lindb. MS.) intermediate between *S. trifaria* and *S. calcarea*, but has not yet been sufficiently examined.

Mr. Wilson gathered, May 14, 1831, near Buxton, in Derbyshire, and sent to me, a variety (*β. longiseta*), of my *S. acutifolia*, which may now be described.

SELIGERIA ACUTIFOLIA, *Lindb.* Autoica, perpauca; foliis viridissimis, supremis ut et bracteis perichætii e basi plus minusve vaginante abrupte angustatis in subulam subteretem, setiformem, acutissimam et pungentem, fragilem, crenulatam, nervo totam fere subulam formante; seta gracillima, brevissima, 1 mm. alta; capsula parva, apices bractearum orificio vix superante, leptodermi, pallida et pellucida, breviter pyriformi, collo brevi; dentibus peristomii brevibus, fere obtusiusculis; rostro operculi brevissimo, capsula quadruplo breviore, vix obliquo.

S. ACUTIFOLIA, *Lindb. in Hartm. Sk. Fl.* ed. 9, ii. p. 75. no. 4 (1864), *et in Not. Sällsk. F. Fl. Fenn. Förh.* ix. p. 261. no. 4 (1868).

Delin.—*Fl. Dan.* (*nondum edita*).

Var. *β*. longiseta (*Lindb.*). Planta major, seta 2–3 mm. alta, capsula alte emergente, rostro operculi longiore et magis obliquo.

S. pusilla, var. foliis perichætialibus longioribus setaceis, *Wils. MS.*

S. acutifolia, var. *β*. longiseta, *Lindb. in Not. Sällsk. F. Fl. Fenn. Förh. l. c.*

This species has the leaves and bracts of *S. paucifolia* (Dicks.) Carruth. (*S. calycina*, Mitt., *S. subcernua*, Schpr.), but the fruit of *S. pusilla* (Ehrh.) B. S.

IX. *Neckera complanata*.

In his excellent Bry. Brit. p. 412, Mr. Wilson has noticed a var. *β. obtusa* (Brid.), Wils., distinguished from the typical form by its "stems shorter, irregularly branched, branches obtuse at the summit." It was found on the ground near Howth by Mr. Scott, and first commemorated by Mr. Turner in his Musc. Hib. Spic. p. 145, in a note, and afterwards called *Leskea* (*Omalia*) *complanata*, var. *β. obtusa*, by Bridel in his Bry. Un. ii. p. 329 (1827). We have not seen the moss in question; so we can only put forth the conjecture that it may perhaps be *Neckera Besseri* (Lob.), Jur., not yet noticed as English.

NECKERA BESSERI (*Lob.*) *Jur.*

Omalia Besseri, *Lob. in Haiding. Naturw. Abh.* i. p. 48, no. 1 (1847).

N. leiophylla, *Gümb. MS.*; *C. Mül. Syn.* ii. p. 44. no. 6 (1851).

N. Sendtneri, *B. S. Bry. Eur.* fasc. 44 & 45, *Monog.* p. 10. no. 6 (1850).

N. Besseri, *Jur. in Verh. Zool.-bot. Ges. Wien,* 1860, p. 368 (ubi fructus descriptus).

Homalia Sendtneri, *Schpr. Synop.* p. 473. no. 3 (1860).

Delin.—*B. S. Bry. Eur. l. c,*

Var. β. rotundifolia (*Hart.*), *Lindb.*

N. rotundifolia, *Hart. Sk. Fl.* ed. 5, p. 338. no. 5 (1849).

Homalia rotundifolia, *Schpr. Syn.* p. 474. no. 4.

Is easily recognized from *N. complanata* by its rounded obtuse leaves, wholly composed of rhombic cells.

X. *Sphagnum curvifolium*, Wils.

Of this I possess only the male plant, collected by the author near Holyhead (March 1856 and October 1857) and at Vale Royal, Cheshire (September and October 1865), growing with *S. subsecundum*.

It is the same as *S. neglectum*, Angstr. in Œfv. V. Ak. Förh. xxi. p. 201 (1864), as Mr. Sullivant first pointed out to me, a species found previously in North America and Scandinavia. It is a collateral species to *S. subsecundum*, but distinct by its cortex (rather *cork*, analogous to the *velamen radicum* on the aerial roots of epiphytical Orchideæ, as I have already pointed out in my essay on Bog-Mosses) formed of two or three layers of cells, as also by its perichætial bracts. It is also a rather polymorphous species.

SPHAGNUM NEGLECTUM, *Angstr. in Œfv. V. Ak. Förh.* xxi. p. 201 (1864).

S. subsecundum (*haud N. Es., C. Mül. Synops.* p. 234. no. 14 (1851).

S. contortum (*haud Schultz*), *Sull. Moss. U. S.* p. 11. no. 3 (1856).

S. curvifolium, *Wils. MS.*

Delin.—*Sull. Icon. Musc. Sup.* (nondum publicatum).

Helsingfors, 30 Dec. 1869.

On the Fertilization and Dissemination of *Duvernoia adhatodoides*. By Mrs. BARBER. (Communicated by Dr. HOOKER, V.P.L.S.)

[Read April 15, 1869.]

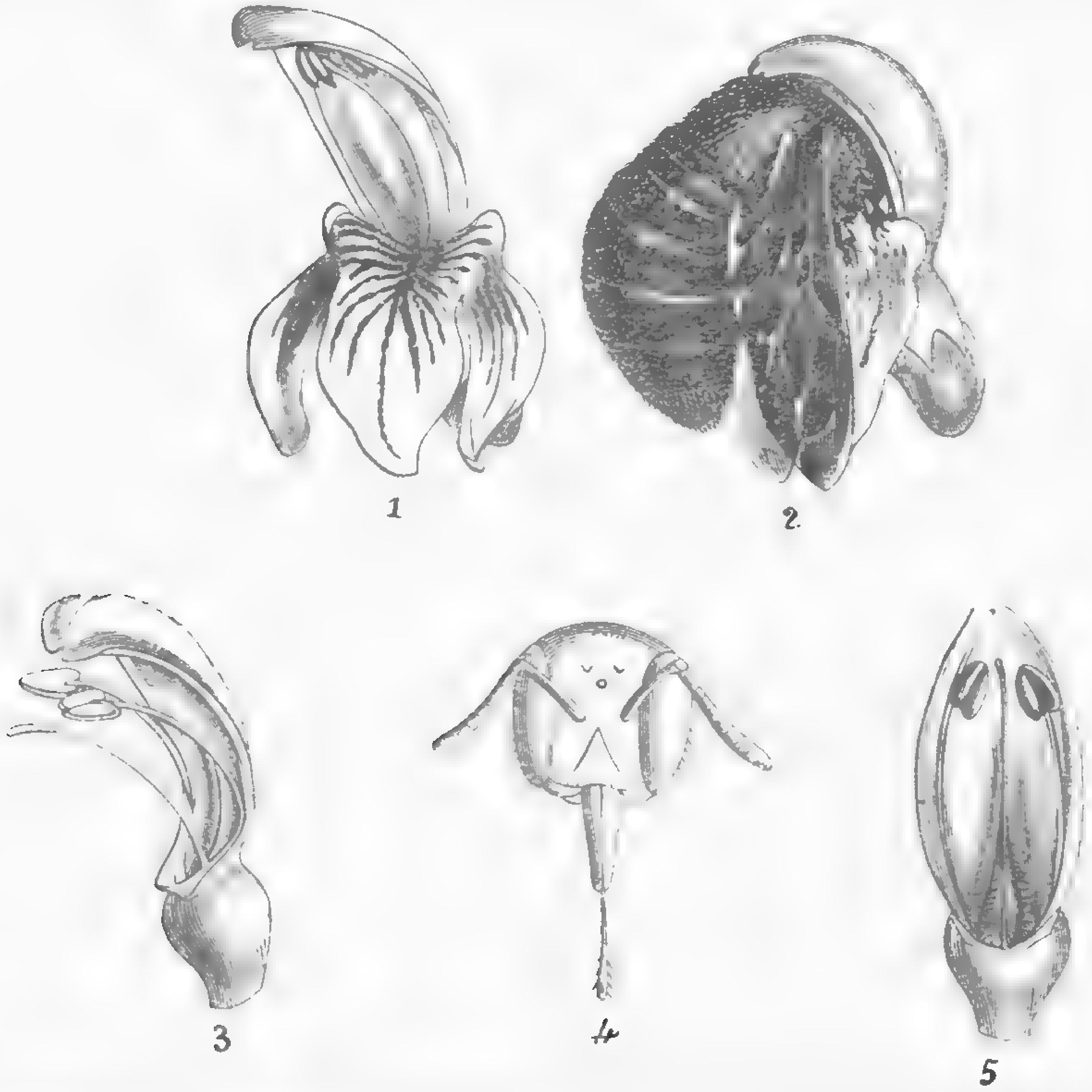
D. adhatodoides (E. Mey. in Drèg. Comm.). Of this handsome species of Acanthaceæ, I received dried specimens and young plants from J. H. Bowker, Esq., of the Frontier Armed and Mounted Police. They were obtained from the forests near Fort Bowker, on the Bashee River, more than 200 miles beyond the colonial boundary, where this fine plant was not uncommon, adding another charm to the many which adorn those lonely but most interesting woods, and forming, with its innumerable snowy blossoms and broad dark-green leaves, a beautiful and conspicuous object amidst the surrounding scenery.

The species is a fine evergreen shrub or small tree, attaining the height of from 8 to 10 feet, with numerous somewhat quadrangular jointed branches, and pink-striped white flowers.

The season of its bloom, which commences rather late in autumn, extends in duration over nearly three months, until near midwinter.

The simple erect flowering branches or spikes of this plant contain several rows of buds; these are arranged in threes, and placed alternately opposite on the inflorescence, the buds of these triflorate groups blossoming in succession; hence the protracted period of its flowering-season.

The blossoms of *D. adhatodoides* are mainly, if not entirely, dependent upon insect agency for their fertilization; and this work is, as far as I have been able to ascertain, performed solely by the large black and yellow Carpenter Bee (a species of the genus *Xylocopa*): this bee, upon all bright and sunny days, is an assiduous labourer amongst the flowers of this plant, creeping into each in succession, and with its powerful wedge-shaped proboscis or beak (see fig. 4) forcing open the constricted tubes, which is done by inserting this wedge-shaped proboscis into the fold which envelops the style (fig. 5): to accomplish this, the bee seizes hold of the lobed projections of the lower divisions of the corolla, and, drawing its body up, forces its head and thorax into the flower; this movement brings the hairy thorax of the bee into the upper lip of the ringent corolla (fig. 3), beneath which are placed the style and stamens (fig. 3). The insect when retiring from the flower brushes out and carries away upon its thorax great quantities of the pollen; and in entering another blossom, in the same manner as described above, the thorax of the bee, laden with pollen-masses, is forced into another ringent blossom; and then coming into contact with the stigma (which projects somewhat beyond the stamens), secures its fertilization, and also obtains from the adjacent stamens a fresh supply of pollen to be carried on in like manner to the next blossom.



No. 1. A flower of *Duvernoia adhatodoides*, natural size.
2. The same, with the bee entering.
3. Flower after fertilization has taken place. The lower divisions of the corolla are removed.
4. The head of the bee.
5. Front view of corolla with the lower divisions removed.

No lepidopterous insect, small bee, or fly could possibly effect the fertilization of *D. adhatodoides*; neither could they obtain nectar from its constricted tubes; for the cunning manner in which they are closed would defy their utmost efforts; and herein lies the mystery of this plant, its wonderful evidence of a divine guardianship, a protecting Power, which cares and provides for all. It is solely to this bee that this plant is indebted for its fertilization, and it is to this bee alone that she yields her honeyed stores. The bee, again, is rewarded with an abundant supply of nectar; in fact, he is paid for his work; "and the labourer is worthy of his hire."

It is interesting to watch these insects busily employing themselves amongst the blossoms of this plant, whilst all other insects pass it by as utterly unworthy of their attentions; surely the one was made for the other, the flowers for the bee, and the bee for the flowers.

I tied a piece of muslin over a flowering branch of the *Duvernoia*, which prevented the bees from entering its blossoms, and this branch produced no seed. I may likewise remark that the spikes which blossom late in the season, after the large bees have retired to winter quarters and have become dormant, also produce no seed. However, I think it not improbable that occasionally a flower or two may be fertilized by the wind blowing one branch against another.

D. adhatodoides is not only remarkable for the manner in which its fertilization takes place, but likewise for the method of its dissemination; for the way in which the seeds of this plant are scattered abroad, is not more curious than clever—although in this respect it is not singular; for many of the species of the order *Acanthaceæ* possess, to a certain degree, the same peculiarities.

The erect wedge-shaped capsules of the plant in question usually contain four seeds; these, by abortion, are often reduced to two; they are placed near the apex, above the long elastic portions of the capsule; each seed is subtended by a rigid, subulate, grooved process, which proceeds from the placenta (apparently a continuation of it), and is prolonged half-way round the seed, which is held in its upright position by this curved groove. When the seeds are matured and perfectly ripe, and the capsule has become hard and dry, a contraction takes place along the opposite sides of the long spring-shaped portions of the valves, causing each to bend diametrically against the other, until at length it explodes or bursts with great force, producing a sound like that caused by the explosion of a small percussion pistol-cap, and at the same time throwing the two valves of the seed-vessel to some distance away from the plant, often, if there are no intervening branches of trees to obstruct their passage, six or seven yards, and, with a favouring wind, often much further. The seeds in their flight through the air, though dry and ripe, do not fall to the ground; they are held in their upright position by the grooved process until the apex of the capsule, overbalanced by its weight, turns in falling, giving the seeds, which are thus cleverly carried to their destination, a free passage to fall to the earth, at some distance away from their parent plant, where, without incommoding it, there may be sufficient room for the future generations of *D. adhatodoides* to spring up and fulfil their destiny.

Highlands, Graham's Town, S. Africa.
Nov. 12, 1867.

On the Modification of the Stamens in a Species of *Begonia*.

By Fritz Müller (in a Letter to Mr. Darwin).

[Read June 3, 1869.]

Itajanez, S. Catharina, Brazil.
March 14, 1869.

My dear Sir,

In your book on 'Variation under Domestication' you mention a remarkable plant of *Begonia frigida* producing hermaphrodite flowers with inferior perianth. I have lately found an analogous wild plant of another *Begonia*, which is here a common weed. In this plant all the male flowers show a strong tendency to become hermaphrodite—one, two, or three of the central stamens being transformed more or less completely into pistils. No two of these male flowers appear to be exactly alike; and almost every day affords a new and surprising modification. Here are some cases:—

Fig. 1.

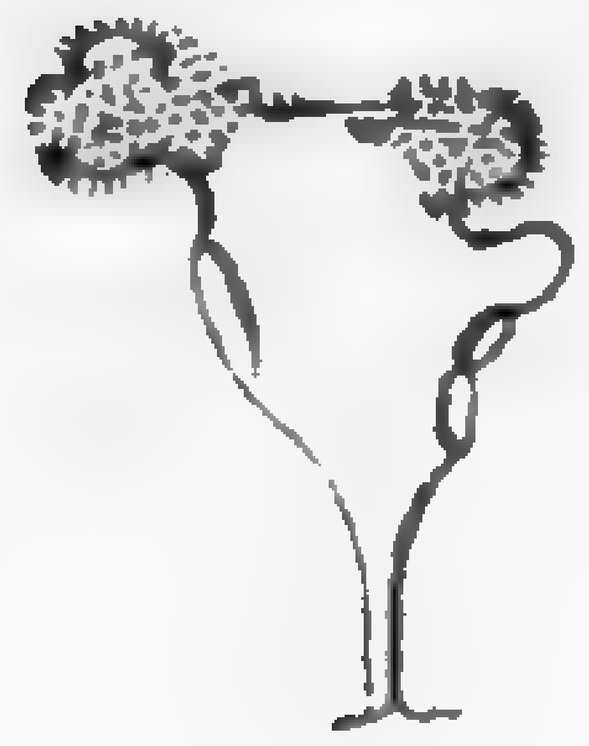


Fig. 2.

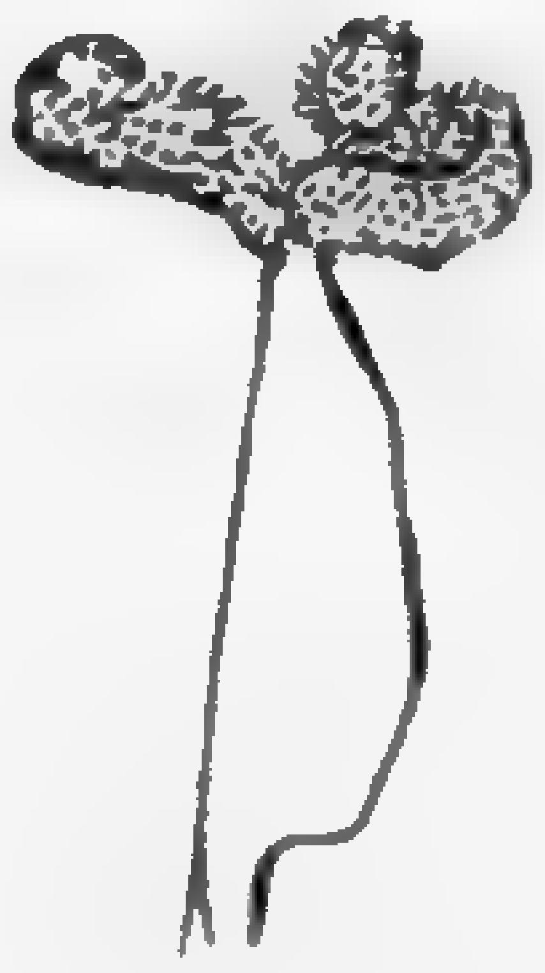


Fig. 3.

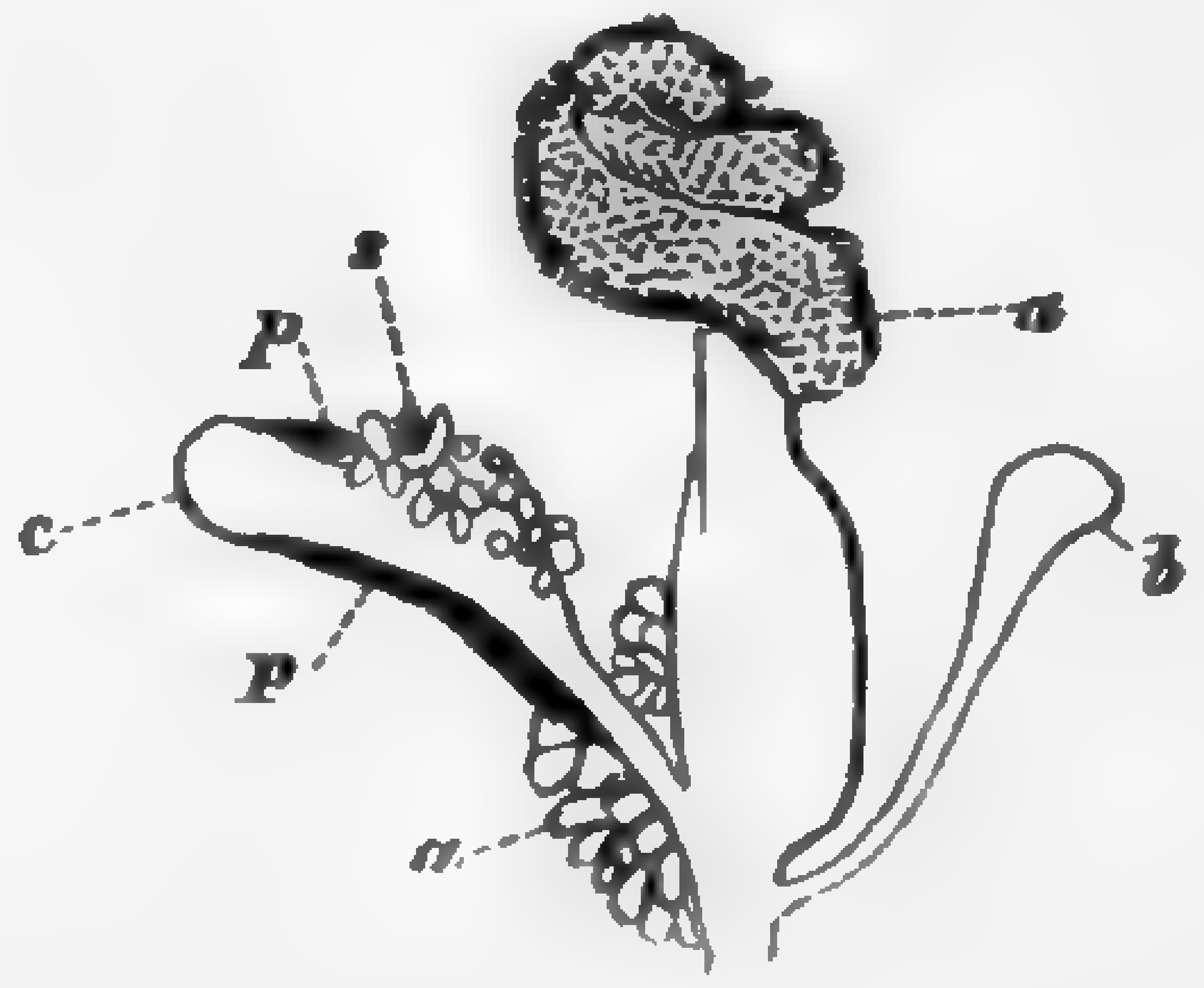


Fig. 4.

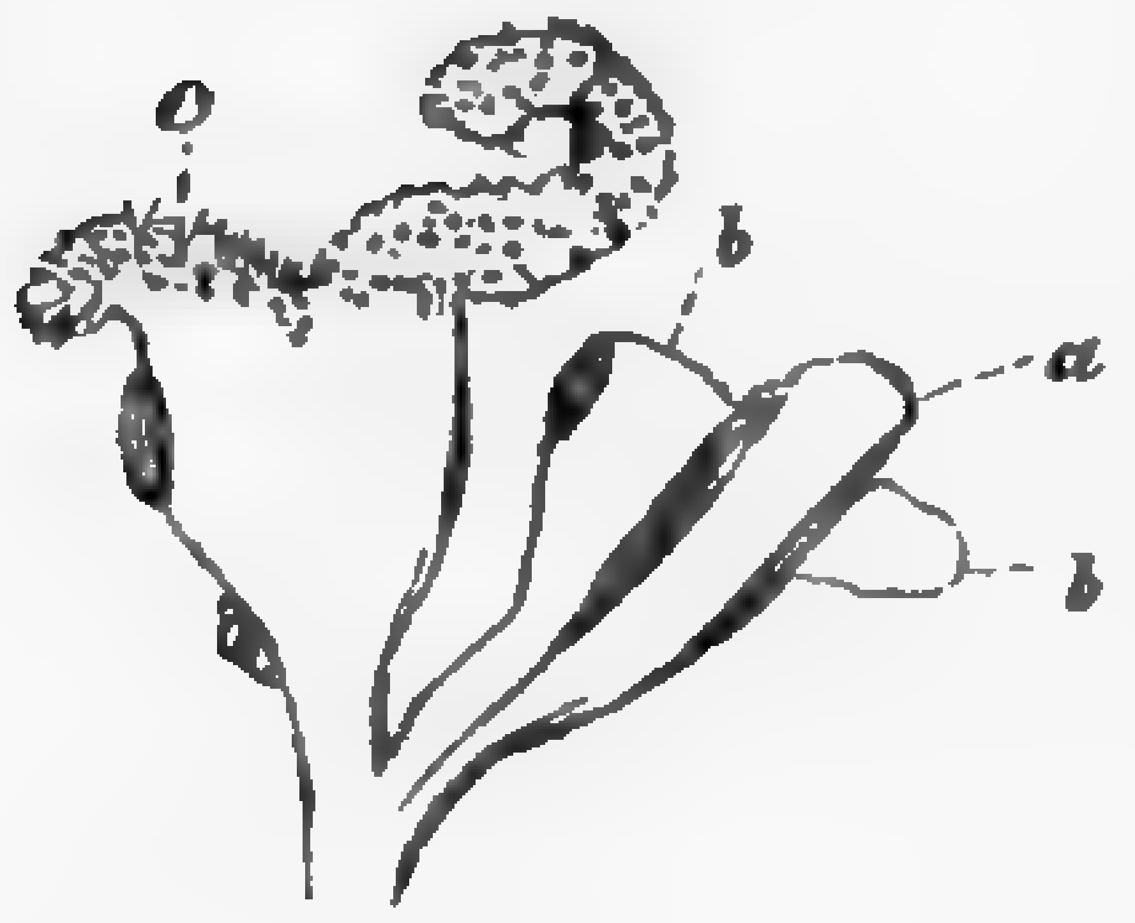


Fig. 5.

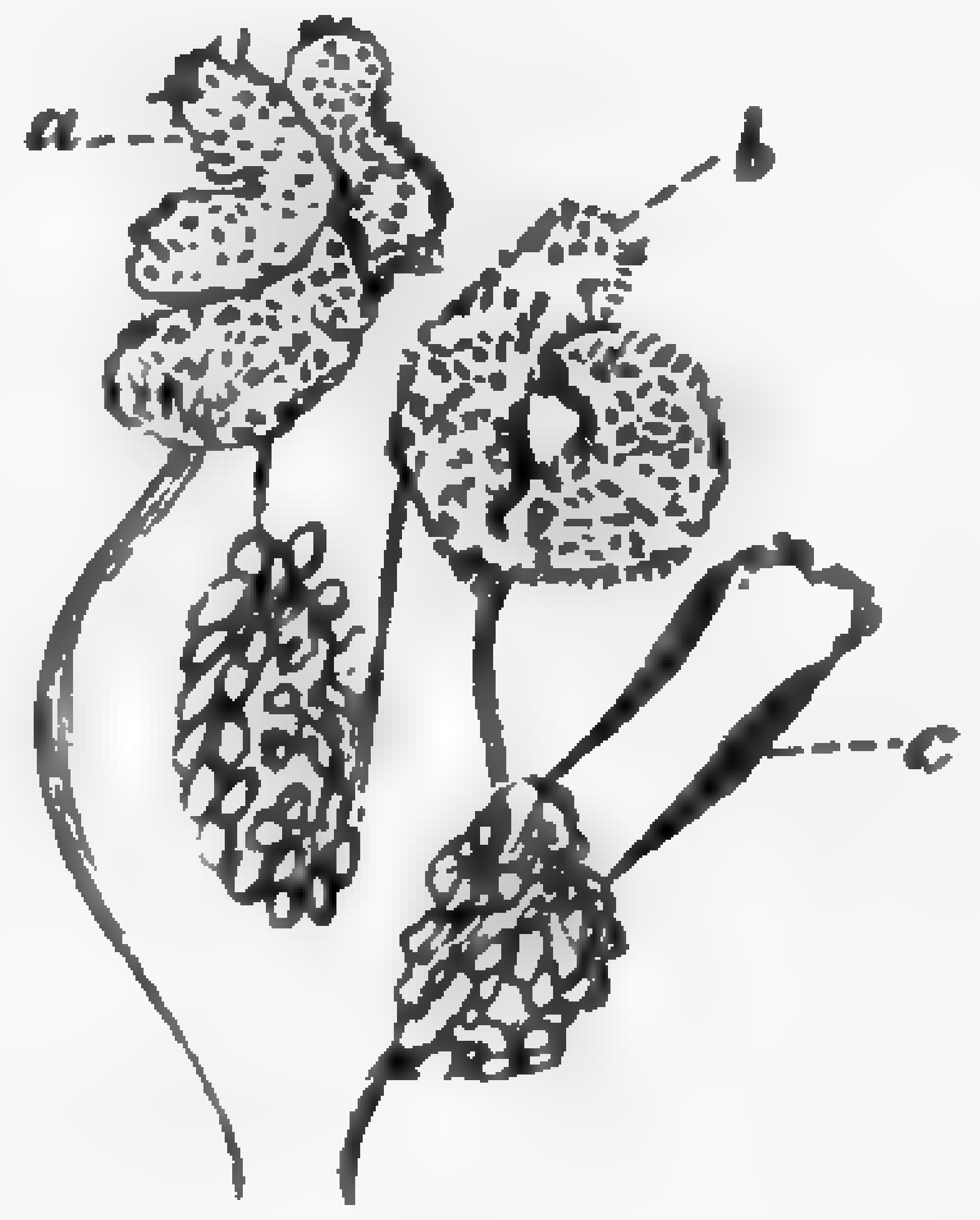


Fig. 1. A single stamen modified; connectivum much dilated; on either margin a short anther with good pollen; at the end, well-developed stigmatic papillæ.

Fig. 2. A single stamen modified; a well-developed stigma; neither anthers nor ovules.

Fig. 3. Three modified stamens, united at the base. *a*, well-developed stigma; no pollen; numerous ovules, differing in nothing from those of the normal ♀ flowers. *b*, club-shaped, without pollen, ovules, and stigmatic papillæ. *c*, pollen on both margins of the connectivum; ovules on the convex margin; apex of the connectivum smooth, without stigmatic papillæ, but one of the ovules transformed into a stigma.

Fig. 4. Three stamens united. *a*, not modified; *b*, connectivum much dilated, pollen on either margin, neither ovules nor stigmatic papillæ; *c*, well-developed stigmatic papillæ, pollen (a small quantity) on one margin alone of the much-dilated connectivum, a few ovules.

Fig. 5. Three stamens, modified and united: *a* and *b* without pollen, with large stigmas and numerous ovules; *c* nearly normal, only the tip of the connectivum being somewhat enlarged and provided with small stigmatic papillæ.

Once I saw (fig. 3, *s*), in the midst of the white ovules, a dark yellow body of a club-shaped form, having nearly the size of an ovule, covered by club-shaped papillæ exactly resembling in shape and colour those of the stigma; so that in this case an ovule appeared to have been transformed into a stigma!

Since I found this plant, I have been looking out for others; and yesterday I at length met with a second specimen (growing within 2 yards distance from the first), which promises to offer still more curious modifications. Some of the male flowers of this second plant have been transformed completely into female ones with superior perianth, but distinguished from the normal ♀ flowers by the perianth having (as in the male flowers) two large broad outer and two small narrow inner segments (whilst the female flowers have five segments, one being smaller), and by their having from four to five stigmas and as many alæ on the ovarium (the female flowers have three). In one of these abnormal female flowers there were some naked ovules between the stigmas beside those included in the ovarium. In the first plant all the ovules of the male flowers are naked. There are some unripe pods on the second plant, all of which are produced by normal ♀ flowers; as soon as they are ripe I shall send you seeds of this second plant also.

Fritz Müller.

Introductory Remarks to Mr. Broughton's Paper on Hybridism among Cinchonæ. By J. E. Howard, F.L.S.

[Read March 3, 1870.]

At the particular request of Mr. Broughton I engaged to read the accompanying paper. The author also wished that I should adduce any arguments that might occur to me against any point that he has mentioned. This his desire, I conclude, arose from my having frequently urged the study of the different kinds cultivated in India, in order to the selection of the sort most adapted for the production of Quinine, as a necessary point to be attended to by those who would cultivate with profit. I have also expressed my belief in the general permanence of the forms, even of the subspecies or varieties of the plant.

I have nothing to urge, however, against the views expressed by Mr. Broughton as to the occurrence of hybrids, but, on the contrary, living specimens which have occurred in my own limited sphere of observation which seem to me to confirm their truth. I am more doubtful about the occurrence of hybridism in the native places of growth of the Cinchonæ, as I do not think there can be in general the same favourable conditions for the interference of the pollen of different species that occur in their cultivated state. I have not, therefore, so much expectation of light being thrown on the botanical arrangement of the genus as is expressed by my correspondent.

Note on Hybridism among Cinchonæ. By J. BROUGHTON, B.Sc., F.C.S., Chemist to the Cinchona Plantations of the Madras Government.

THE Cinchonæ have long been known as plants whose flowers show in each individual that singular difference in the respective prominence of the stamens and pistil which has since received the name of *dimorphism*. The special forms have been named by the Spaniards respectively *macho* and *hembra*, according as the male or female organs are prominent in the blossoms of any single tree. The researches of Mr. Darwin have shown the consequences of this peculiarity as it affects the fertilization of the seed in the parallel cases of *Primula*, *Oxalis*, &c.*

On the Cinchona plantations of the Madras Government are now growing, blossoming, and fruiting nearly all the valuable febrifuge-yielding species. Individuals of the various species are, in very numerous instances, planted in close proximity. The seeds are produced in great abundance, and have been used for the purpose of obtaining seedling plants for the extension of the plantations: under these circumstances, it might have been predicted beforehand that hybrids would appear,

These considerations did not, however, occur to me as a chemist. But as it is my duty to make a chemical examination of the bark of all varieties occurring on the plantations, some circumstances occurred which brought the above prominently under my notice. Among some young trees raised from Neilgherry seed was a plant of great beauty, quite distinct in appearance from any of the elder or originally introduced kinds. It had the general aspect, pyramidal habit, and luxuriance of *C. succirubra*, but at the same time the lovely purple tints and velvety appearance which characterize the leaves of the "Grey Barks" when young. Its bark resembled that of *C. succirubra*, but was lighter in colour. But on analysis it yielded 1·45 per cent. of nearly pure *cinchonine*, instead of about 3·00 per cent. of alkaloid mainly consisting of quinine and cinchonidine, as was the general yield of its neighbours of *C. succirubra* of the same age. So unusual a result led me so repeat the analysis and to make full inquiries into the origin of the plant. I then learned from the Assistant Superintendent in charge of the plantation that the plant had been picked up under a tree of *C. micrantha* as a natural seedling, its parent growing in proximity to trees of *C. succirubra*, which blossom at the same period.

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* After numerous trials I have not succeeded in detecting any clear difference between the amounts of alkaloid contained in the bark of the *macho* and *hembra* forms.

This circumstance set me examining young seedling plantations in order to find, if possible, other instances. I found among them forms which are not to be met with among the parent trees, and which are new to the plantations. One of these is a variety which combines resemblances to the very dissimilar species of *officinalis* and *succirubra*, having the large leaves and habit of the latter with the ovate-lanceolate leaves also of the texture characteristic of the former. Some of the leaves also possessed scrobicules. The bark of one individual yielded 2·8 per cent. of alkaloid consisting of Cinchonidine and Cinchonine, while that of another gave me 2·8 per cent. of alkaloid consisting of 1·3 of quinine and the remainder of cinchonidine and cinchonine. In the latter case the quinine crystallized as sulphate with the ease which marks this alkaloid when obtained from *C. officinalis*. I cannot but consider the chemical character of the bark an independent corroboration of the hybrid character of the plant.

Other varieties are appearing among seedling trees, which, though their origin can be less clearly made out than in the former instances, can scarcely be explained without assuming that they are natural hybrids.

Among the hundreds of thousands of trees of *C. officinalis* growing on the Neilgherries, very various and numerous differences are to be found. If each of the characteristic forms were to be distinguished by name, more than twenty new varieties might be constituted possessing, in certain specimens, as distinct an identity as that attributed to the vars. *Bonplandiana*, *Uritusinga*, &c., which are now recognized by botanists. These numerous varieties merge into one another by insensible gradations; and as it would be impossible to keep seedling plants of each separated, they are all mixed in the plantations. I submit that this natural confusion of varieties and subvarieties is a consequence of the interbreeding of the various kinds. As many of the kinds were introduced by seed into India, it appears to me to be highly probable that certain of these are not the pure descendants of plants possessing in all respects the recognized botanical characters of the respective kinds. As a matter of practical experience, I find that the yield of alkaloids is tolerably constant in very various varieties of the same species, even when the difference in habit, foliage, &c. is marked.

The variations are also clearly apparent in the species *succirubra* and *calisaya*.

The object of this note is to call the attention of competent botanists to these facts as being well worthy of consideration in carrying out any future classification. I cannot forbear expressing a hope that they may lead to a simplification in the botanical arrangement of the genus, which at present is so confused as to be in some cases almost a hindrance to the correct appreciation of the actual living realities.

On the Occurrence of Pleiotaxy of the Perianth in *Philesia*.

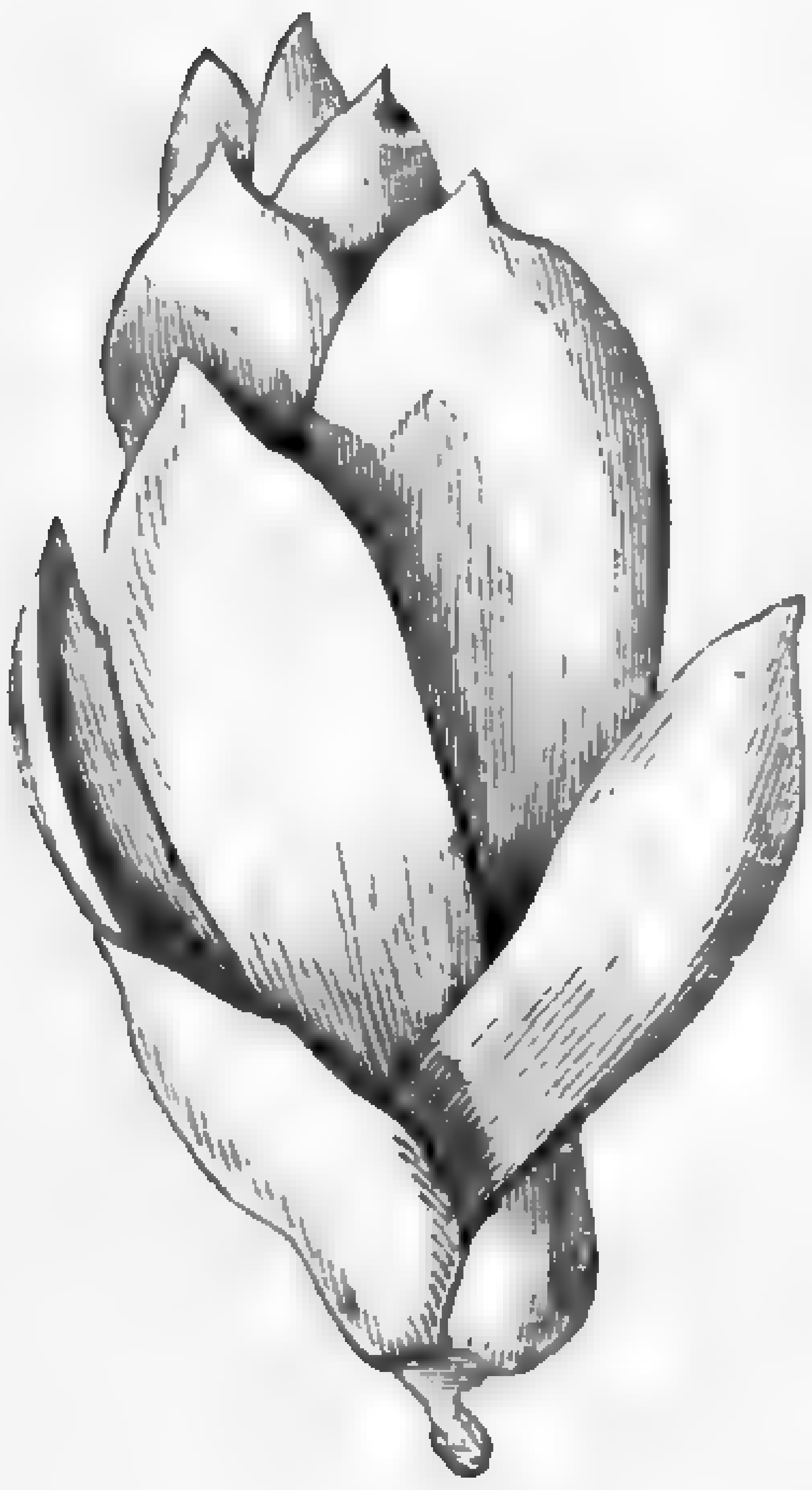
By R. O. CUNNINGHAM, M.D., F.L.S.

[Read April 7, 1870.]

THE recent perusal of Dr. Masters's valuable work on 'Vegetable Teratology' has induced me to bring before the notice of the Members of the Linnean Society a form of monstrosity of which I have met with several examples in the flower of *Philesia*, a genus of Smilaceous endogens, in which no instances of double flowers appear to have been as yet recorded. This genus, it is hardly necessary to remark, consists of but one species, the beautiful *P. buxifolia*, which occurs plentifully in the damp wooded region of Fuegia and the western parts of the Strait of Magelhaens, extending up the west coast of South America, at least as far as Valdivia, to the north of which it is replaced by its still handsome ally *Lapageria rosea*, which possesses a much more limited range, not extending far to the north of Concepcion.

The ordinary form of the flower of *Philesia* consists, as is well known, of a hexaphyllous perianth, furnished at the base with two or more small bracts. Of the six laciniæ, the three *outer*, which vary very much in size in individual specimens, are both shorter and narrower than the *inner*, each of which is provided internally at the base with a greenish-yellow glandular pit secreting a sweet honey-like fluid. The stamens, six in number, and inserted at the base of the perianth, have their filaments united into a tube for some distance upwards; their anthers are of a linear form and of a yellow colour; and the contained pollen-grains are spherical, and under a moderate magnifying-power exhibit a hispid surface. Through the stamen-tube passes the elongated style, which bears at its extremity the obscurely three-lobed glutinous stigma.

Of the abnormal form of the flower, I found at least three specimens in the western part of the Strait of Magellan and the Channels on the west coast of Patagonia; and as they do not materially differ from one another in arrangement of parts, a very brief description of one of them, gathered in the month of March, 1868, at Playa Parda Cove, on the south-west of the Cordova Peninsula, may suffice. In that specimen, which was associated with two other flowers of the natural form, instead of six divisions of the perianth being present, there were eighteen; and these all possessed the same general form, which, as a reference to the sketch will show, differed considerably from that ordinarily exhibited. The colour was the same as usual, save that the tips of the greater number of the laciniæ were provided with a light green mucro, and that a few of the most external were tinged with green at the base. On making a section of the flower, I found that there were only three perfect stamens, one of which was partially coherent with a fourth, which had become petaloid in its nature, though still retaining an anther-lobe. The pistil presented, instead of a three-lobed, a distinctly two-cleft stigma. It is a fact worthy of mention, as regards the growth of *Philesia*,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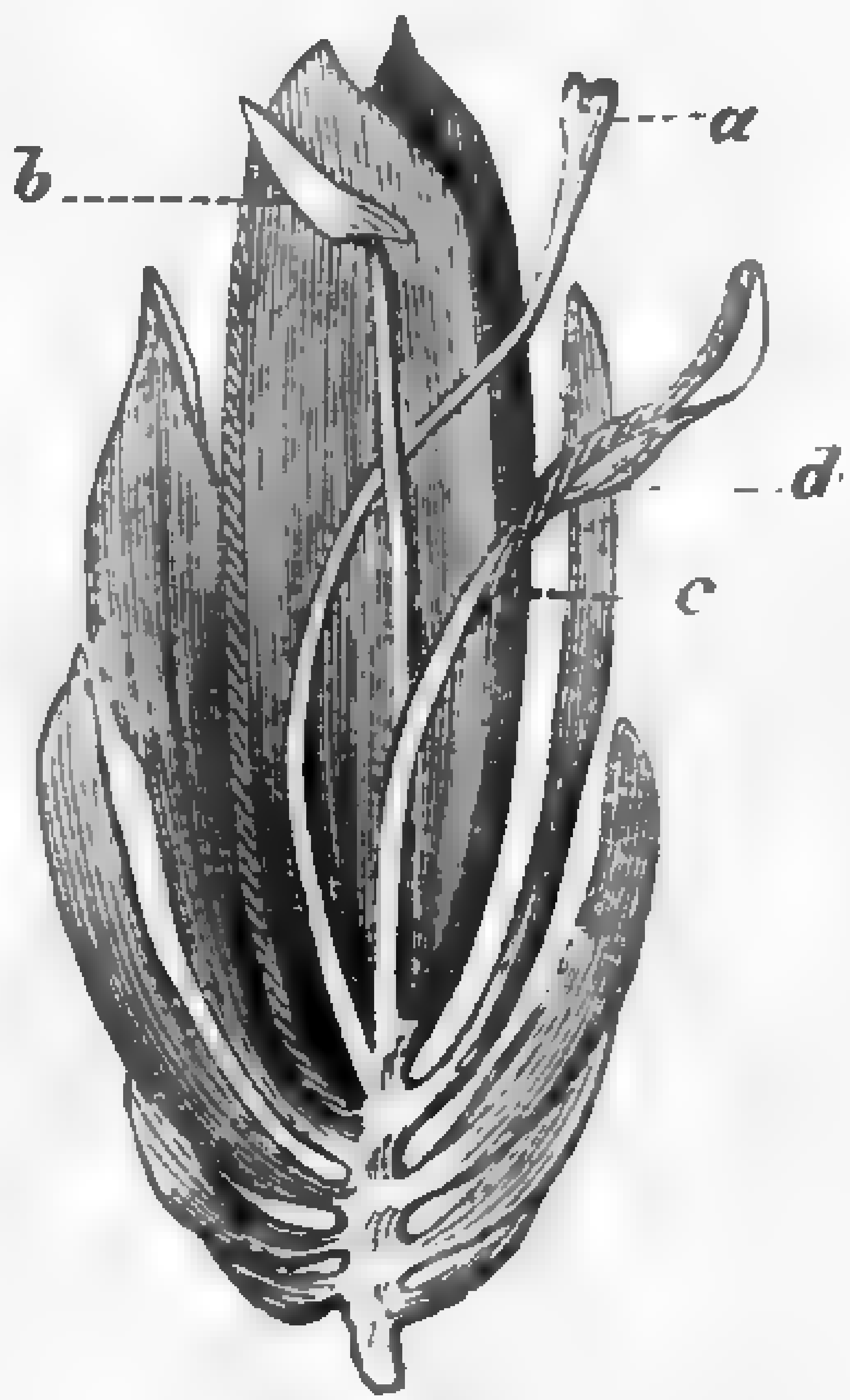

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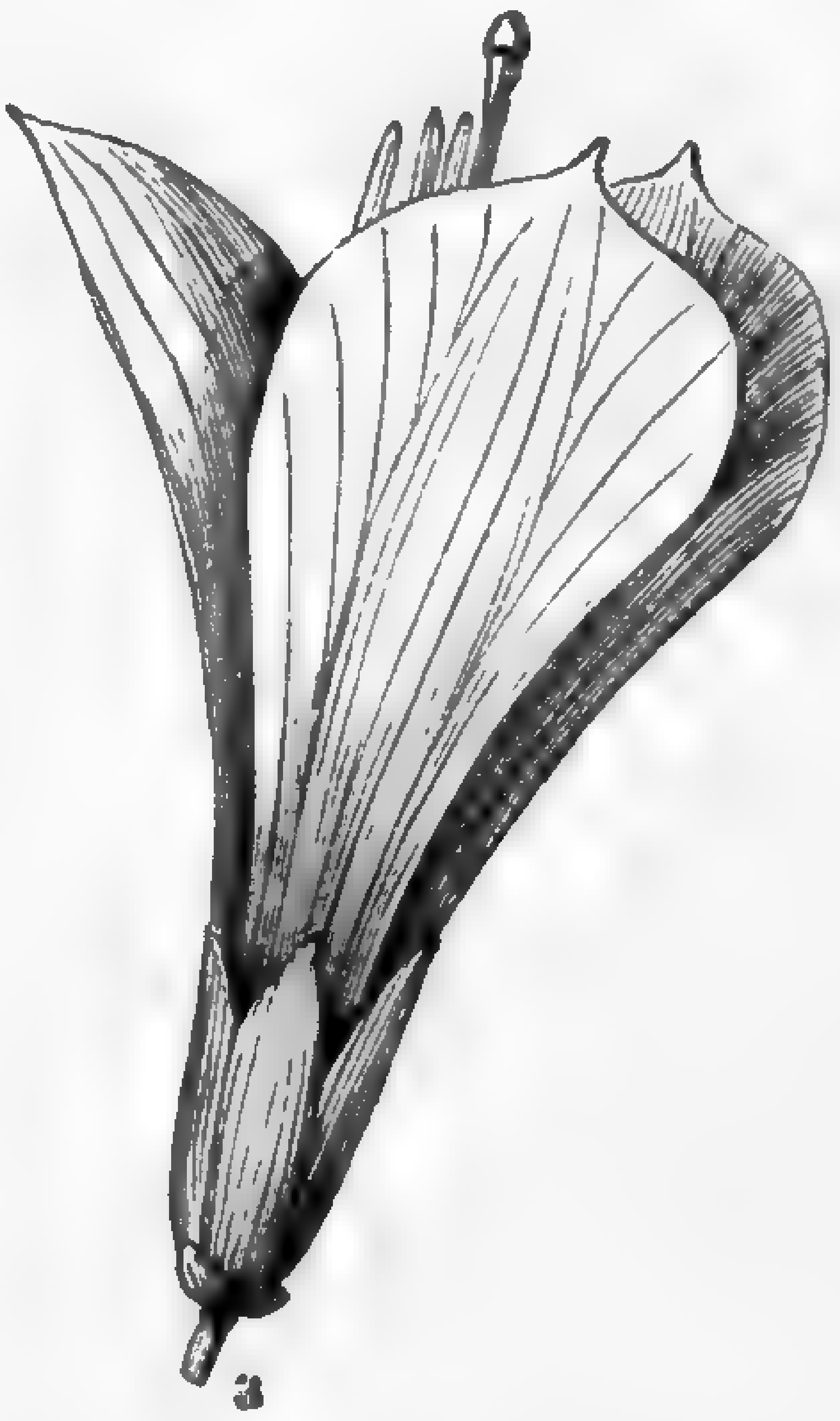
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Fig. 1. Double flower of *Philesia*.

Fig. 2. Section of ditto, exhibiting stamens of ordinary form adhering by filament to a petaloid stamen and pistil, with two-cleft stigma: *a*, stigma; *b*, ordinary stamen; *c*, section of petaloid stamen; *d*, its anther.

Fig. 3. Ordinary flower of *Philesia*, from a dried specimen.

that while in general it forms a low suberect under-shrub, yet, like some other Magellanic plants, such as *Prionotes*, it frequently assumes a scandent habit, attaining a height of from 12 to 14 feet when supported by the trunk of a tree; and in illustration of this, I may mention that on more than one occasion I have climbed a tree in order to reach its fine rose-coloured flowers.

On Copal. By Dr. Kirk. (Extract from a Letter to Dr. Hooker dated Zanzibar, November 13, 1869.)

[Read May 5, 1870.]

Having had a few days again at the coast, where I had to go in order to meet the Sultan, I had occasion to make a few observations that may interest you, and to collect plants, many of which I know are new, not only to me, but to the Kew Museum; these I shall send through the F. O. by the first opportunity.

I must first premise that my excursions were limited to three miles from the coast, and that the Uzaramo country beyond is still, to all intents, a *terra incognita* to the botanist, rich in plants; and I know of no more promising field for a three months' excursion, if I only had the time, than the hill of Usawbara, 4000 feet high, and the Uraramo plains, both opposite the island of Zanzibar.

Having already made some observations on the formation of copal (or *Animi*) and the tree which yields it now, I paid considerable attention to the subject this time. In the dense forest I was struck with the immense number and size of these trees, far exceeding any thing that I had before imagined. In no instance did I see the soft juice flowing: where found on the tree it was invariably hard. I send a fine specimen removed from the living tree; it will show you that now large masses, equalling in size the fossils, are still produced, and full of insects, as were those of the ancient forests. In the dense jungles, where these trees are found the largest, there is no under-grass to catch fire and to destroy the fallen trunks; when a tree dies it rots until, eaten by white ants, it falls piece by piece on the ground; any resinous masses would thus be preserved. Struck by the number of these trees, I commenced turning up the sandy soil to the depth of 10 inches, when I soon found small pieces of *Animi*, but not of the modern sort. There was no Copal-tree in the place where I dug; and the resin had lain there, it may be, for centuries. This led me to examine minutely the outer skin; and I found, as you will see from the pieces when they arrive, that copal when dug up has no trace of the goose-skin upon it. I am now satisfied that this is due to a change in the surface of the mass after exposure, when, to a certain depth, an oxidation takes place, or it may be a molelecular change, rendering the skin more brittle than the inner mass. When treated with a solution of caustic soda, this brittle crust softens, and, on drying, cracks to the full depth to which the change has taken place. After drying in the sun, the friable crust may be removed with a hair brush, and then for the first time we see the goose-skin, characteristic of good or fossil *Animi*.

When cleaning copal, it may be that each merchant throws away as much as thirty pounds daily of this dusty resin brushed off the copal, and this they call sand; but I send you a specimen to show you that it is genuine resin and, I suspect, of value, at least worth more than being cast into the sea, as is here done.

On my return home one evening I came upon an old Baobab tree that had been cut down in clearing the ground; the tree was, on the average, 6 feet in diameter; it had been cut about two years, and had lived for at least one year after being completely severed from the ground; now it seemed to have been dead for a year, and was fast rotting. On tearing off the layers that gaped open and parted from one another far more easily than the bark of other trees from the wood, I found that the last vital act had been to give out a stiff lace-like network of rootlets between each annual layer; so coarse were these at places as to resemble a fishing-net. These woody plates, separated by layers of matted roots, varied in thickness from $\frac{1}{4}$–$\frac{1}{2}$ an inch; and this exactly corresponds with observations made by me on the growth of living trees of the same sort, which long ago convinced me that the huge Baobabs of Africa do not possess the great age usually ascribed to them; a tree of 6 feet may be 100 years old. In this instance the last-formed circumferential layers were fully as thick as the central. That the central layers are indications of annual growth, I think proved by my observations on young trees, of which I have examined many.

In the herbarium you will find my new plants, some, I think, new even to the Kew collections, and highly interesting.

There is one which I should place not far from *Cardiospermum*, a moderate-sized tree; this I can refer to no genus; it may, however, be ex-African, and I have no time to dip into the genera just at present; but if this should prove new, please call it *Majidea*, after our late Sultan, Seyd Majid *.

Since collecting, I have had no time to examine my plants; but the little I did on the spot showed that this small collection is of considerable interest, and I have collected in each case a number of specimens.

J. Kirk.

New Lichens recently discovered in Great Britain.

By the Rev. James M. Crombie, M.A., F.L.S. and F.G.S.

[Read June 2, 1870.]

Amongst many rare and previously undetected British lichens, met with in the course of my botanical rambles, chiefly during the last five, and more especially the last three years, the following *new species*, which, with two exceptions, have been named by Dr. Wm. Nylander, of Paris, have rewarded my researches in several parts of the country far distant from each other. As a considerable proportion of them are from well-known localities, such as Ben Lawers and the New Forest, which have been repeatedly searched by some of our most zealous lichenologists, it is evident that Great Britain is still far from being exhausted, and that many hitherto undescribed species will be detected on further investigation. And, indeed, this is confirmed by my discovery of a new species last month near Hendon, in Middlesex, a county the poorest in its list of lichens of any in Britain—though even here another new species was some years ago discovered by Mr. Currey, and duly reported in my recent 'Enumeratio.' The lichenology of large tracts of country both in Great Britain and Ireland is still but little known; while more especially the western portions of the counties of Inverness, Ross, and Sutherland, in Scotland, are still almost a *terra incognita* with respect both to our phænogamics and cryptogamics. There is every reason to believe that an examination of these tracts would bring to light many additions and novelties to our Lichen-flora.

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* Described as *Majidea zanguebarica* in 'Icones Plantarum,' tab. 1097.

1. **Spilonema scoticum**, *Nyl. in Flora*, 1869, p. 82. Thallus black, forming small, compact, convex, pulvinate patches: apothecia black, very minute, the epithecium impressed or convex; spores 8 in thecæ, colourless, oviform-oblong, 1-septate, ·010–·014 millim. long, about ·0045 millim. thick: paraphyses discrete, slender: epithecium vaguely obscure, hypothecium colourless: hymeneal gelatine blue with iodine.

On damp micaceous rocks of Ben Lawers above Loch-na-Cat, August 1867. Rare, and but very sparingly fertile, though, from the small size of the apothecia, almost invisible to the naked eye, these are very apt to be overlooked. It is allied to *S. revertens*, Nyl., from which, however, it is sufficiently distinguished by the size of the apothecia and the character of the spores.

2. **Pyrenopsis homœopsis**, *Nyl. in Flora*, 1868, p. 342. Thallus brown, thin, effuse, subgranulose: apothecia concolorous, lecanorine, small, epithecium colourless, paraphyses slender: spores ·011–·018 millim. long, ·007–·010 millim. thick: hymeneal gelatine reddish wine-coloured, or yellowish wine-coloured with iodine.

On micaceous boulders on the summit of Ben Lawers, August, 1867. Apparently very rare, and seen only in small quantity, growing along with *Lecanora frustulosa*, Dcks. It is most nearly allied to *P. grumulifera*, a Scandinavian species, but differs from this, amongst other characters, in its larger spores and gonima.

3. **Lecanora hypophæa**, *Nyl. in Flora*, 1870, p. 34. Thallus indeterminate, greyish or greyish-green, thin, granulate, unequal; apothecia reddish black, lecidean, at first plane, margined, the proper margin black, subcrenulate or undulated, then somewhat convex, with excluded margin: spores innumerable, oblong, ·005–·006 millim. long, ·0015 millim. thick: paraphyses of about medium thickness, articulated: hypothecium colourless, beneath slightly dark brownish: hymeneal gelatine wine- or tawny-red with iodine.

On granitic stones of a wall near old Machar Cathedral, Aberdeen, August 1869. Not unfrequent in one or two spots in that locality, and often athalline, though, from the nature of the stone, only a single good specimen was obtained. It is allied to *L. privigena*, Ach., from which it is separated by the above characters.

4. **Lecidea lithophiliza**, *Nyl. in Flora*, 1868, p. 473. Thallus greyish white, firm, unequally deplanate, areolate-diffractate or areolate-rimose, thin: apothecia brownish black, brown when moist,

somewhat plane or convex, immarginate, white within: spores 8 in thecæ, colourless, oblong, simple, ·009–·017 millim. long, ·0035–·0045 millim. thick: paraphyses of medium thickness, lurid brown at apex: hypothecium chalky-white in the middle, and black in the lower stratum: hymeneal gelatine distinctly blue with iodine.

On micaceous stones of a wall near Portlethen, Kincardineshire, south of Aberdeen, August 1868. Apparently rare, and gathered but sparingly, notwithstanding a somewhat protracted search. Its specific name seems to indicate its propinquity to *L. lithophila*, Ach., a species not uncommon on the Welsh and Grampian mountains; but Nylander observes that it ought rather to occupy a place amongst the *Biatoræ* of Fries, near to *L. phæops*, Nyl., a plant of Ben Lawers and Cader Idris.

5. **Lecidea mœstula**, *Nyl. in Flora*, 1868, p. 344. Thallus greyish, thin, subgranulate or evanescent; apothecia black, minute or small, plane or convex, numerous and crowded, usually immarginate, colourless within; spores eight in thecæ, colourless, elliptical, simple, ·007–·008 millim. long, ·0025–·0035 millim. thick: paraphyses not discrete, epithecium colourless or obscure; hypothecium obscurely brown throughout: spermatia oblong, with short sterigmata: hymeneal gelatine wine-red with iodine.

On old rails near Lyndhurst, in the New Forest, Hants, September 1866. Abundant in the spot where gathered, and likely to occur elsewhere in that neighbourhood, as also no doubt in similar tracts at least in the south of England. Its systematic place is near *L. turgidula*, Frs.; and it is nearly allied to *L. myriocarpoides*, Nyl., a species not yet detected in Britain.

6. **Lecidea tenera**, *Nyl. in Flora*, 1869, p. 83. Thallus greyish green, thin, somewhat subgranulate, indeterminate, everywhere rimulose: apothecia pale, minute, plane, with paler margin: spores eight in thecæ, colourless, oblong or subbacillar, simple or obsoletely 1-septate, ·008–·010 millim. long, ·0015–·0025 millim. thick: paraphyses of medium thickness, with clavate apex: epithecium and hypothecium colourless: spermogones with oblong spermatia: hymeneal gelatine blue with iodine.

On the smooth face of a granitic rock on the coast of Kincardineshire, south of the bay of Nigg, August 1868. Though occurring plentifully in one spot in a shady situation, it was seen by me nowhere else in the neighbourhood, at least in a fertile state. It is allied to *L. globulosa*, Flk., from which it is distinguished by the above characters.

7. **Lecidea spododes**, *Nyl. in litt.; Crombie in Seem. Jour. Bot.* 1869, p. 233. Thallus greenish yellow, thin, granulose, somewhat evanescent: apothecia cinereous or sordid pale, small, convex, immarginate: spores simple, oblong, ·010–·014 millim. long, ·0025–·0040 millim. thick (with hydrate of potass slightly or spuriously 3-septate): hymeneal gelatine blue, and then wine-red, with iodine.

On old pales near Lyndhurst, in the New Forest, April 1869. Apparently rare and local. It is closely allied to *L. denigrata*, Frs., of which probably it is to be regarded as a subspecies, though externally in colour of thallus and apothecia it is readily distinguished from this.

8. **Lecidea parissima**, *Nyl. in litt.* Thallus sordid, greyish green when moist, granulose, indeterminate; apothecia blackish, reddish brown when moist, small, more or less crowded: spores oblong or fusiform-oblong, simple, ·007–·011 millim. long, ·0025–·0035 millim. thick (with hydrate of potass showing an obsolete septum), the epithecium also being obsoletely violet tinged with the same: spermatia oblong-cylindrical: hymeneal gelatine wine-yellow with iodine.

On an old pale at Golder's Green, Hendon, Middlesex, May 1870. Plentiful in one spot, and may be expected to occur elsewhere in similar situations near stagnant water. Like the preceding, it is closely allied to *L. denigrata*, Frs., from which it differs chiefly in the reaction with iodine as above.

9. **Lecidea subturgidula**, *Nyl. in Flora*, 1868, p. 343. Thallus greenish white, very thin, effuse: apothecia pale, more or less livid, opaque, convex, small, immarginate, hypothecium brownish: spores eight in thecæ, colourless, oblong, simple or slightly 1–3-septate, ·008–·014 millim. long, ·003–·004 millim. thick: paraphyses not discrete, epithecium yellowish white: hymeneal gelatine blue and then yellowish with iodine.

On the decaying wood of old decorticated hollies in the New Forest, near Lyndhurst railway-junction, May 1868. Very rare and found sparingly only on two trees, notwithstanding a somewhat extended search in different parts of the forest. Its systematic place amongst British species is near to *L. melæna*, Nyl.

10. **Lecidea deducta**, *Nyl. in litt.; Cromb. in Seem. Jour. Bot.* 1869, p. 233. Thallus obscurely subgelatinous, but scarcely proper (traces of a greenish effuse thallus being here and there visible): apothecia blackish, small, usually margined: spores 8 in thecæ, colourless or faintly blackish, elliptical or oblong, 3-septate, ·010–·013 millim. long, ·0035–·0045 millim. thick: paraphyses not discrete, thin layer

of epithecium reddish (hypothecium more obscure in the middle): hymeneal gelatine blue, then wine-red, with iodine.

On decaying felled stumps of holly in the New Forest, near to Brockenhurst, April 1869. Very rare, and met with but in one spot. From the preceding, to which it is otherwise closely allied, and of which it may be but a subspecies, it differs chiefly by the apothecia being black and margined.

11. LECIDEA LEPTOSTIGMA, *Nyl. in Flora,* 1868, p. 344. Thallus (if proper) greyish white, rimulose: apothecia brownish black, innate, small, gregarious: spores eight in thecæ, globose or ellipsoid, ·005–·009 millim. in diameter, uniseriate in the cylindrical thecæ: paraphyses of medium thickness, sordid yellow towards the apex; hypothecium scarcely yellowish: hymeneal gelatine not coloured with iodine.

On a micaceous weathered boulder near Loch-na-Cat, on Ben Lawers, August 1867. Apparently extremely rare, and gathered only very sparingly. It is allied to *L. resinæ*, Frs., and, as Nylander observes, may perhaps be only a small fungus, though I suspect fungologists would reject it from their list.

12. LECIDEA INTERLUDENS, *Nyl. in Flora,* 1870, p. 35. Thallus white or greyish white, thin, rimulose-areolate, limited by black lines: apothecia black, superficial, convex, immarginate, or often with a white epithalline margin, colourless within; spores eight in thecæ, colourless, ellipsoid, ·010–·012 millim. long, ·006–·008 millim. thick: paraphyses of medium thickness, with clavate brownish apex: spermatia short: hymeneal gelatine blue with iodine, and the thecæ themselves wine- or violet-red.

On calcareous boulders of Morrone, Braemar, August 1869. Rare, and but very sparingly gathered. It is allied to *L. mollis*, Whlnb., a species not yet detected in Britain, from which it is distinguished by its larger elliptical spores and the other characters now mentioned.

13. LECIDEA MESOTROPA, *Nyl. in Flora,* 1867, p. 328. Thallus greyish, verrucose-areolate, indeterminate, of medium thickness: apothecia brownish black or black, opaque, somewhat plane, adnate, the margin obtuse or evanescent, white within: spores eight in thecæ, ellipsoid, ·009–·013 millim. long, ·005–·006 millim. thick: paraphyses slender, usually not discrete: epithecium brownish: hypothecium colourless: hymeneal gelatine blue with iodine.

On a gneissic boulder on the descent from Ben Lomond to Loch Ard, August 1865. This at first was regarded by Nylander as a distinct species belonging to the group of *L. contigua*, Frs. On further examination, however, and having regard to the thalline reaction, he says, in a letter recently received, that it ought rather to be referred to *L. tessellata*, Flk., as a variety, if not merely an unusual state of this species.

14. LECIDEA SARCOGYNIZA, *Nyl. in Flora*, 1868, p. 475. Thallus obscurely greyish green or subolivaceous, opaque, thin, indeterminate: apothecia black, plane, margined, the margin usually flexuose, obscure within: spores eight in thecæ, colourless, oblong, ·007–·011 millim. long, about ·003 millim. thick: thalamium colourless, paraphyses of medium thickness, club-shaped and blackish at apex: hypothecium under the hymenium distinctly brown: perithecium blackish or black: hymeneal gelatine intensely blue with iodine.

On granitic stones of wall by railway, a little beyond the Bay of Nigg, in Kincardineshire, August 1868. Apparently very rare in that locality, though I gathered it more plentifully, but athalline, in the subsequent autumn, on quartzose boulders of Morrone, Braemar. It follows the depressions and chinks in the stone, and is apt to be overlooked as a mere state of *L. lithophila*, Ach., to which it is closely allied.

15. LECIDEA CROMBIEI, *Jones in litt.*; *Nyl. in Flora*, 1868, p. 345. Thallus greenish sulphur-coloured, of medium thickness, uneven, rimose diffractate or subareolate, limited by the black hypothallus, which is everywhere visible between the areolæ: apothecia black, of medium size, innate, somewhat convex, immarginate, obscurely greyish within: spores eight in thecæ, colourless, elliptical, ·010–·012 millim. long, ·006–·007 millim. thick: thalamium blue, epithecium bluish black, hypothecium colourless or faintly reddish: paraphyses not well discrete: hymeneal gelatine blue with iodine (the thecæ more intensely coloured at apex).

On serpentine rocks of the Khoil, in Braemar, July 1865. This species was first distinguished as such by the late Admiral Jones, and has subsequently been sparingly gathered by Mr. Carroll on Mangerton in Kerry, by Dr. Holl on Ben Lawers, and by myself in Glen Callater. Specimens from the last of these localities show its near affinity to *L. aglæa*, Smmrf., of which, in my own opinion, it is to be considered only a variety.

16. LECIDEA APHANOIDES, *Nyl. in Flora*, 1868, p. 470. Thallus obscurely olive-grey, thin, subverrucose, or subgranulose, unequal, indeterminate, or subevanescent: apothecia black, small, convex, immarginate, naked, white within: spores eight in thecæ, colourless,

elliptical, simple, ·009–·013 millim. long, ·0045–·0055 millim. thick: paraphyses not discrete: thalamium with the epithecium bluish, hypothecium colourless or vaguely reddish below: hymeneal gelatine blue, and then violet-red with iodine.

On calcareous rocks of Craig Guie, near Crathie church, in Braemar, August 1868. Apparently rare, and gathered only very sparingly beside the limestone quarry. It is allied to *L. aphana*, Nyl., a species found in Ireland by Mr. Carroll, both, with the following, belonging to the group of *L. furvella*, Nyl.

17. **Lecidea melaphana**, *Nyl. in Flora*, 1869, p. 83. Thallus black, thin, opaque, unequal, somewhat diffractate: apothecia black, small, convex, immarginate, obscure within: spores eight in thecæ, colourless, oblong, simple, ·011–·019 millim. long, ·0045–·0055 millim. thick: paraphyses not discrete, epithecium with upper portion of thalamium blue, hypothecium slightly brownish below: hymeneal gelatine blue with iodine, and then partly of a violet colour.

On schistose boulders of Craig Guie, in Braemar, August 1868. Like the preceding, to which it is closely allied, this species occurred, but in very small quantity, amongst the boulders which lie thickly scattered on the lower slope of the hill, westward from the quarry.

18. **Lecidea inserena**, *Nyl. in Flora*, 1869, p. 84. Thallus obscurely greyish, rimose-areolate; the hypothallus black, visible, or denudate: apothecia somewhat tumid, black within, paraphyses not discrete, epithecium bluish brown, hypothecium with white opaque stratum beneath: spores eight in thecæ, ellipsoid-oblong, ·014–·017 millim. long. ·006–·008 millim. thick: hymeneal gelatine blue with iodine.

On calcareous rocks of Craig Guie in Braemar, August 1868. Very rare. This species, which belongs to the group of *L. tenebrosa*, Flot., occurs also very sparingly on Morrone, according to a small scrap in my herbarium, which was gathered there in 1861, but not then correctly named.

19. **Lecidea postuma**, *Nyl. in Flora*, 1868, p. 345. Thallus greyish, thin, scattered, evanescent: apothecia black, minute, plane, margined, concolorous within: spores 6–8 in thecæ, colourless or brownish, elliptical oblong, 3-septate (often with the addition of oblique or longitudinal septules), ·015–·016 millim. long, ·006–·007 millim. thick: epithecium brownish: hymeneal gelatine deep blue with iodine.

On calcareous stones in gravelly places, near the summit of Morrone, in Braemar, July 1865. Probably not very rare, though but a single specimen was then gathered, and I have not since succeeded in finding others. It approaches very closely to *L. petræa*, Flot., but seems sufficiently distinct from all the states of that variable species.

20. **Lecidea præcavenda**, *Nyl. in litt.*; *Cromb. in Seem. Jour. Bot.* 1869, p. 232. Thallus obscure, thin, scarcely visible, but apparently blackish green: apothecia black, plane, or somewhat concave, margined, small: spores 8 in thecæ, faintly blackish, ellipsoid, 1-septate, ·014–·017 millim. long, ·006–·008 millim. thick: paraphyses slender: epithecium obscurely amber-brown, above more intense in colour: hymeneal gelatine blue, and then wine-red with iodine.

On the decaying wood of an old holly near Lyndhurst in the New Forest, April 1869. Very rare and local, having been found only very sparingly on a single tree. Nylander observed that it is distinguished from *L. myriocarpa*, DC., by the form of the paraphyses and the reaction with iodine, and from *L. adpressa*, Hepp, by the paraphyses, and the colour of the spores and hypothecium.

21. **Lecidea commaculans**, *Nyl. in Flora*, 1868, p. 476. Thallus greyish or brownish black, thin, subareolate, depressed, usually scattered, indeterminate, often wanting: apothecia black, small, convex, scarcely margined, concolorous within: spores eight in thecæ, colourless, oblong, ·008–·011 millim. long, ·003–·004 millim. broad: paraphyses not discrete, epithecium blackish, hypothecium thick, reddish brown: hymeneal gelatine blue with iodine.

On hard felspathic boulders, near the summit of Morrone, in Braemar, August 1868. Apparently rare towards the north-west brow of the mountain; and from the nature of the rock, specimens were with difficulty obtained. It belongs to the group of *L. geographica*, Lin.

22. **Lecidea symphorella**, *Nyl. in Flora*, 1870, p. 35. Thallus obscure, or but slightly visible: apothecia innate, black, minute, convex, immarginate, aggregated in heaps (each of which is composed of several apothecia), concolorous within, spores eight in thecæ, colourless, oblong, simple, ·010–·018 millim long, ·004–·007 millim. thick: paraphyses of medium thickness, or not always discrete: epithecium sordid blue or brownish: hypothecium dark brown: hymeneal gelatine and the thecæ wine-red, or wine-violet, with iodine.

On loose calcareous stones amongst detritus on the summit of Morrone, Braemar, August 1869. Apparently rare, and gathered sparingly in only a single spot not far from the Cairn. It is somewhat doubtful, as Nylander observes, to what genus this species belongs. There is present a white, thin, areolate, diffractate, evanescent, lecidean thallus; but this seems scarcely proper; and also another obscure thallus nearly obsolete, adnate, or under the apothecia, with green elliptical gonidia (almost gonima), thickly involute, which would appear to be the real thallus, inasmuch as this is constantly present, while the other is frequently absent.

23. Rimularia limborina, *Nyl. in Flora*, 1868, pp. 346, 476. Thallus greyish, thin, rimulose or subareolate: apothecia black or brownish black, rugulose, somewhat depresso-convex, small, roundish, subradiately fissured, greyish within: spores eight in thecæ, colourless, at length brownish, elliptical, simple, ·018–·025 millim. long, ·011–·016 millim. thick; paraphyses slender, irregular, and often branched: perithecium black above, brownish black below: hymeneal gelatine tawny red with iodine.

On weathered calcareous stones on Craig Guie, Braemar, August 1865. This new genus and species was described by Nylander in the Flora from a specimen gathered about the same time as my own, by Ripart, in Haute Vienne. It is allied to the genus *Mycoporum*, and along with it may be regarded as constituting a separate tribe, which Nylander has called Peridiei, intermediate between the Graphidei and Pyrenocarpei.

24. Endocarpon Crombiei, *Mudd, Brit. Clad.* p. 36. Parasitic on thallus of *Thamnolia vermicularis*: apothecia verrucæform, lateral, minute, at length emersed, confluent, each verruca containing many nuclei: ostiola very minute, punctiform, depressed, pale reddish brown: nucleus subgelatinous in yellowish brown subceraceous tunic: paraphyses slender, discrete; spores 8 in thecæ, very minute, elliptical, unilocular, occasionally obscurely bilocular, hyaline.

Apparently not very rare on the higher Grampians of Scotland, as Ben Lawers, Morrone, Ben-na-boord, on which last mountain it was first discovered by me in August 1862. Though regarded by Mudd, *l. c.*, as a true lichen, Nylander considers it a *fungillus*; and indeed it seems to be one of those anomalous things of which the systematic place is at present rather doubtful.

In addition to these, I have also met with the following new forms of other lichens, which I may here briefly notice, viz.:—

1. *Parmelia lanata*, var. *subciliata*, Nyl., with thallus depressed, suborbicular, the laciniæ and apothecia ciliated at the margins. Rare, on limestone-rocks of Morrone, in Braemar. 2. *Lecanora umbrina*,* *prosechoides*, Nyl., with small black or brown apothecia,

ellipsoid simple spores ·008–·012 millim. long, ·0045–·0055 millim. thick, and paraphyses usually somewhat thickish, clavate. Common on maritime rocks on the coast of Kincardineshire, including *L. lainea*, Frs., and *L. helicopis*, f. *dilutior*, Nyl. 3. *Lecanora varia*, var. *symmicta*, f. *livescens*, Nyl. Distinguished chiefly by its small livid apothecia. Sparingly on trunks of old trees at High-beech, Epping Forest. 4. *Lecanora ventosa*, var. *subfestiva*, Nyl., with thallus greyish yellow, verrucose, granulate, thick, and apothecia rusty red, margined. Rare, on a schistose boulder at base of Morrone, Braemar, the apothecia having a close external resemblance to those of f. *festiva*, Ach., of *Lecanora ferruginea*. 5. *Lecidea lapicida*, * *lithophiloides*, Nyl., with evanescent thallus, apothecia white within; spores oblong, ·011–·015 millim. long, ·0035–·0045 millim. thick, and black epithecium. On rocks on the Kincardineshire coast and on Ben-nahoord, Braemar. 6. *Lecidea ocellata*, * *præponens*, Nyl., with thallus yellow, areolate or granulate-verruculose; apothecia subinnate, rugulose, immarginate; spores ·015–·017 millim. long, ·008–·010 millim. thick. On stones of the railway-wall between Nigg and Cove on the coast of Kincardineshire. 7. *Verrucaria cinerella*, var. *megaspora*, Nyl., with spores ·023–·036 long, ·009–·013 millim. thick. On bark of hollies, not unfrequent in several parts of the New Forest.

Petalody * of the Sepals in *Serapias*.

By J. T. Moggridge, Esq., F.L.S.

(Plate III.)

[Read June 16, 1870.]

It was in April, 1867, at Mentone, in the Département des Alpes Maritimes, that I first observed a plant of *Serapias lingua*, L., presenting the abnormal development which I am about to describe. In this individual there were five expanded flowers, in all of which the lateral sepals were modified so as to become semilabelliform—that is to say, presenting all the characters of one half of the labellum along one side, and this the side adjacent to the true labellum, while the opposite or posterior side of the lateral sepals remained of the ordinary sepal structure. One of these flowers is represented of the natural size at fig. 1, and its parts magnified below; and in this one the column was perfect, while in the other four flowers it was reduced to a mere rudimentary process above the callus or guiding-plates, neither anther nor stigmatic surface being traceable. In all the ovary was less than half its proper length; but otherwise the remaining parts of each flower were normal, though rather small, except that the sepals and petals were free, not forming a hood.

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* I borrow here the term used by Dr. Masters in his 'Vegetable Teratology,' which conveys the assumption of the petal structure by the sepals, stamens, or carpels. It will be remembered that the labellum is itself a modified petal.

During the past spring (April 20–23, 1870) I have again come across this curious form of monstrosity at Mentone, but this time in *Serapias cordigera*, L. I examined no less than six specimens of *S. cordigera*, L., all of which faithfully reproduced the kind of modification described and figured above in *S. lingua*, L., the column being perfect in all; while in one other specimen, having six expanded flowers, one flower corresponded with that figured in its abnormal details, one was perfectly formed, and the four remaining flowers exhibited different stages of the partial conversion of the lateral petals. It is instructive to note that in all the complete specimens it was the same part that was affected, and that both the kind and amount of change was the same in all: thus, both in *S. lingua*, L., and *S. cordigera*, L., it was always the anterior* half of the lateral sepals that became labelliform; and so exactly was the line of demarcation observed between the changed and unchanged halves of these sepals, that in every case only one half of the callus or guiding-plate was developed (figs. 1 *b* and 1 *c*, Plate III.). In all these abnormal flowers, also, the ovary was reduced to less than one half its ordinary length; and in four out of the five flowers on the spike of *S. lingua*, L., the column was rudimentary.

The exact reproduction of these semilabelliform sepals in eight distinct plants belonging to two species of *Serapias* surely indicates that this is no mere passing change brought upon the plant by the action of some temporary condition, but rather a deep-seated tendency forming a part of the constitution of these species, or perhaps of the genus, a tendency which may be always present in each individual, though usually in a latent condition.

In order to realize the extent and the detailed nature of this modification (which can in no sense be called a malformation), it is important to compare the structure in the normal and abnormal flower. In the normal lateral sepal (fig. 2 *a*) the limb is free from the base of the labellum, in a lower plane, and not more or less confluent with it, as in the case of the abnormal sepals (fig. 1 *h*); the central nerve has on either side of it two bi-trifurcated nerves, the central and the lateral nerves springing from the bundle of vessels which supply the adjacent side of the labellum, and form part of the group described by Mr. Darwin as the *antero-lateral*; but the central and posterior nerves join this bundle at a common point close to its immersion in the ovary, while the anterior nerve unites with the same bundle of vessels at a point nearer to the base of the labellum; this anterior nerve, in the abnormal flower, undergoes a complete change, and, in place of being only once or twice branched, assumes in every respect the character of the adjacent lateral nerve of the labellum, sending out a quantity of branched veins through the newly developed lateral lobe and along its whole course on the side away from the central nerve. Thus we have the following important changes in either lateral sepal of these abnormal flowers:—(1) the limb is confluent at one or more points with the labellum; (2) the anterior nerve takes on the character of the much-branched adjacent nerve of the labellum; (3) one of the guiding-plates is developed; (4) a lateral lobe and (5) a hairy-surfaced structure, precisely similar to the corresponding part of the labellum, replace the whole anterior longitudinal half.

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* Throughout I refer to the position of the parts of the flower as found in expanded blooms.

Mr. Darwin's hypothesis of *Pangenesis* enables us to form a conception of the mode in which tendencies of any kind may be transmitted through a lapse of time incalculably long either in a dormant or active state. I have lately, during my attempts to arrange and draw deductions from a series of observations on minute variation in wild plants, become more and more impressed with the belief that each individual includes within itself a great variety of latent tendencies, the development of which is occasionally facilitated by the disturbing action of changed surrounding conditions. Thus in *Arbutus Unedo*, L., the fruits, when suffering from the attacks of white scale, do not usually become mere shapeless masses, but assume types well recognized as characterizing entire trees, and often present two or three forms on the same branch, becoming ovate-acute, globose-depressed, subpentagonal, or the like. Here, since we find that both in normal and abnormal variation the fruits tend to assume similar types, it is hard to resist the conclusion that the production of these forms is due to tendencies which make a part of the constitution of the plant; for the disease which, in the case of the abnormal variation, might be taken for the cause of the modification, is absent in the case of the normal variation.

It would appear, from Dr. Masters's 'Vegetable Teratology,' that petalody of the sepals is of rare occurrence, and that instances of the assumption of the characters of the inner by the outer perianth-segments of Orchidaceæ have not hitherto been recorded. It would seem more intelligible if the two upper petals had taken on the labelliform condition, as the labellum is itself a modified petal; and it is, at first sight, hard to form even a conjecture why the lateral sepals of *Serapias* should so systematically undergo this change.

If, however, we turn to Mr. Darwin's 'Fertilization of Orchids' (p. 294 &c.), we learn something of the homologies of the labellum, which may perhaps supply us with a clue. Mr. Darwin, from a study of the course of the spiral vessels through the tissues of the flowers of Orchids, arrived at the conclusion that the two missing stamens of the outer whorl are combined with the labellum on either side of its central nerve, the evidence of which is found in the bundles of spiral vessels which I have called the lateral nerves. Now it is exactly these parts that are brought into contact with the modified portions of the lateral sepals; and it does not seem a very improbable conjecture that the change observed in these latter may be due to the partial diversion or bifurcation of the spiral vessels belonging to the two missing stamens. It is very tempting to make one more suggestion, founded upon the preceding hypothesis, and to speculate whether (if it be true that the introduction of spiral vessels belonging to either stamen into the two lateral sepals suffices for the production in either of half a labellum, in place of the ordinary sepal-structure) the combination of the two stamens with the anterior petal may not readily account for its change into a labellum.

I have twice seen forms of *Ophrys insectifera*, L., in each of which one of the flowers was entirely destitute of a labellum, and the lateral sepals were united along their anterior margins, so that they assumed the position of the missing labellum. In one of these plants, which belonged to the subspecies *Bertolonii*, Mor., at the base of the column of the monstrous flower, which was prolonged below the stigmatic cavity, three distinct spots served to mark the position of the three nerves or bundles of spiral vessels, of which the two lateral ones belong to the missing stamens, and the central one to the mid nerve of the labellum. At fig. 3 I have given a sketch of this flower, which was the lowest on its spike, but not placed in the axil of its bract. Dr. Masters * mentions several instances of similar modifications, which appear to be not uncommon in Orchidaceæ; but I do not find any allusion to the presence of three spots at the base of the column which serve to illustrate the position of the spiral vessels traced by Mr. Darwin in the labellum. These spots were entirely superficial.

DESCRIPTION OF THE PLATE.

Fig. 1, abnormal flower of *Serapias lingua*, L., of the natural size; fig. 1 *a*, upper sepal; 1 *b* and 1 *c*, semilabelliform lateral sepals; 1 *d*, labellum; 1 *e* and 1 *f*, petals; 1 *g*, the column; 1 *h*, basal portions of the lateral sepals and of the labellum, the column having been removed so as to show the course of the three groups of spiral vessels which enter the labellum, and of their branches which supply the lateral sepals: figs. 1 *a* to 1 *h*, all magnified.

Fig. 2, normal flower of *S. lingua*, L., of the natural size; 2 *a*, lateral sepal of the same, slightly magnified.

Fig. 3, abnormal flower of subsp. *Ophrys Bertolonii*, Mor., of the natural size.

The Fungi of Ceylon. By the Rev. M. J. Berkeley, M.A., F.L.S., and C. E. Broome, Esq., F.L.S. (Hymenomycetes, from *Agaricus* to *Cantharellus*.)

[Read June 16, 1870.]

The materials in our possession, beside others to which we have access, are very considerable. We possess almost a complete set of those which were collected by the late Dr. Gardner; those transmitted by Mr. Thwaites comprise more than twelve hundred numbers, above three hundred of which have been beautifully figured; while those of Dr. König, preserved in the British Museum, have already been described by one of us in the 'Annals of Natural History.' Any general observations on the Fungi of Ceylon had better be reserved till we have had the whole collection under review; but meanwhile, as far as regards the species described in this first notice, it will at once be remarked how closely the Agarics, which comprise 302 species, resemble those of our own country. Though many species do not seem to be identical, still we have frequently had great difficulty in accurately estimating the difference. It is singular that every one of the subgenera of Fries is represented, though the number of species in one or two is greatly predominant. *Lepiota* and *Psalliota* alone comprise one-third of the species, while *Pholiota*, which one might expect to be well represented, offers only a single obscure species. It has frequently been a matter of doubt whether particular species should be refered to *Lepiota* or *Psalliota*, since the colour of the spores sometimes changes in drying with the rest of the plant. We have therefore been obliged to be guided by what we know of European species, having merely drawings and dried specimens to help us. If, therefore, we have in this case committed any errors, they must be left to the reconsideration of Ceylon botanists with fresh specimens before them. As the drawings will hereafter be returned to Ceylon, careful copies being reserved for this country, there will be no want of materials for the purpose. The figures have been made, under the superintendence of our indefatigable friend Mr. Thwaites, by a native artist (Mr. De Alwis), and are admirable, both as to execution and details. Indeed it would be difficult to point out any which so completely satisfy the most stringent requirements, with the single exception of microscopical matters, which, in most cases, we have been able to supply. Exception, perhaps, may be taken to so many of the specific names being derived from the Greek; but in such an enormous genus the great point was to avoid the danger of using terms which are already appropriated, a matter of extreme difficulty even with the help of the best published lists. It will be well, indeed, if we have not sometimes suffered wreck on a rock nearer home. Specimens of a few of the more striking drawings have already been laid before the Society; and it is a matter of regret that it is simply impossible to publish the whole series. The copies, however, will ultimately be deposited in the library at Kew.

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* 'Teratology,' p. 398 (Meiophylly of the Corolla).

1. **Agaricus (Amanita) hemibaphus**, *B. & Br. in Linn. Tr.* xxvii. p. 149, tab. 33 *a*. (No. 700.)

On the ground. Peradeniya. Sept. 1868. Spores ·0003′–·0004′ long by ·0002′ wide *.

2. **A. (Amanita) vaginatus**, *Bull.* (No. 777 mixed with some *Volvaria*, cum icone.)

On the ground. Peradeniya. Aug. Sept. 1868.

No. 719 is a slate-coloured variety.

3. **A. (Amanita) anomologus**, *B. & Br.* Pileo convexo umbonato glabro stipiteque e farcto cavo glutine hyalino (volva universali) obsitis; lamellis angustis adnexis (no. 1296, cum icone).

On the ground. Jan. 30, 1869.

Pileus 1½ inch across, cinerous, strongly and obtusely umbonate, clothed, as is the straight stuffed stem, with transparent mucilage; stem 3 inches high, 1½–2 lines thick, slightly attenuated upwards; gills 1 line broad, white, arched, free, or only slightly adnexed.

Apparently a debased *Amanita* analogous to one of those in the last section of Fries, approaching *Lepiota*.

4. **A. (Lepiota) procerus**, *Scop. Carn.* 418; *Gardner*, no. 99.

On the ground in shady places. Peradeniya. Sept. 1844.

5. **A. (Lepiota) dolichaulos**, *B. & Br. in Linn. Tr.* xxvii. p. 150. (No. 706, 694, cum icone.)

Amongst grass. Peradeniya. July 1868, Jan. 1869.

6. **A. (Lepiota) continuus**, *B. in Lond. Journ. Bot.* vi. p. 480; *Gardner*, no. 29.

On the ground in shady places. Peradeniya. June 1844. Spores ·0005′ long.

7. **A. (Lepiota) oncopus**, *B. & Br.* Albus; pileo e digitaliformi convexo subcarnoso verrucis minutis exasperato, margine crenato; stipite podagroso verrucoso farcto; lamellis ventricosis postice attenuatis remotis (no. 792, cum icone).

On the ground. Peradeniya. Nov. 1868.

White; pileus 5 inches across, at first digitaliform, obtuse, then expanded, broadly umbonate, clothed with minute warts; flesh rather thick, except toward the crenate margin; stem 5 inches or more high, gouty below, clothed, especially above, with little superficial warts, stuffed; ring ample, torn; gills nearly ½ an inch wide, ventricose, attenuated behind; spores very pale yellow, oblong, ·00045′ long; mycelium delicate, white.

A. continuus may possibly prove to be a wartless form of this species.

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* The decimals in this paper are all parts of an English inch.

8. A. (LEPIOTA) ZEYLANICUS, *B. Lond. Journ. Bot.* vi. p. 480; *Gardner*, no. 15; *Thwaites* (no. 37).—A. theloides, *B. & Br. in Tr. Linn. Soc.* xxvii. p. 150. (No. 688, cum icone.)

In shady places on the ground. Peradeniya. June 1844. *Gardner*, July, Sept. 1868; *Thwaites*. Spores subglobose, ·0003′–·0005′ long.

9. A. (LEPIOTA) SUBCLYPEOLARIUS, *B. & C. in Journ. Linn. Soc.* x. p. 283. (No. 37 in part.)

On the ground. Peradeniya, Nov. 1867, July 1868. Spores ·0003′ long.

10. A. (LEPIOTA) RUBRICATUS, *B. & Br.* Pileo e campanulato plano-convexo obtuso vel umbonato, margine sulcato parce squamuloso; stipite subæquali, lamellis distantibus postice attenuatis approximatis (no. 37, cum icone).

On the ground. Peradeniya, Sept. Nov. 1868.

Pileus 2 inches or more across, campanulate, pale, but (like the whole plant and especially the gills) turning red in drying; margin sulcate; gills attenuated behind, varying in breadth, approximate, lemon-coloured; spores ·0004′–·0005′ long; stem 3 inches or more high, ¼ thick, nearly equal, stuffed with cottony threads.

11. A. (LEPIOTA) INEBRIATUS, *B. & Br.* Pileo campanulato fortiter umbonato subcarnoso in squamulas parvas superficiales sericeas rupto, margine striato; stipite sursum attenuato glabro; annulo mobili; lamellis ventricosis subremotis postice attenuatis (nos. 701, 780, cum icone).

On the ground. July, Aug. 1868.

Pileus 2 inches or more across, at first campanulate, then expanded, strongly but obtusely umbonate, pale yellowish, broken up into flat silky scales; umbo smooth, darker, margin striate; stem 3 inches high, slightly attenuated upwards, stuffed, then hollow, whitish, smooth, sometimes rooting; ring entire, moveable; gills white, ventricose, two lines wide, attenuated behind; spores oblong, ·0003′–·00035′ long.

Vinous when cut or in drying, but not so strongly as in some other species. No. 819 is a small variety.

12. A. (LEPIOTA) HOLOSPILOTUS, *B. & Br.* Pileo plano subcarnoso striato pallide carneo fibrilloso squamulis atropurpureis notato; stipite clavato flexuoso ubique punctato; annulo atro-purpureo angusto submobili; lamellis pallide stramineis ventricosis postice attenuatis approximatis (no. 1171, cum icone).

On the ground. July 1869.

Pileus nearly 1½ inch across, plane, rather fleshy, pale pinkish, striate, fibrillose, with scattered brown-purple scales; stem 2 inches high, 1½ line thick in the centre, clavate, sprinkled both above and below the ring with dark specks; ring more or less moveable, brown-purple; gills pale, straw-coloured, 1 line wide, ventricose, attenuated behind, approximate; spores ovate, ·000$\dot{3}$′ long.

Whole plant dark when dry. Allied to *A. biornatus*.

13. A. (LEPIOTA) CARPHOPHYLLUS, *B. & Br.* Pileo convexo obtuso subcarnoso subfulvo, centro pulveraceo, margine fibrilloso; stipite recto concolori e farcto cavo; annulo descendente mobili candido; lamellis stramineis ventricosis postice attenuatis approximatis (no. 1165, cum icone).

On the ground. July 1869.

Pileus 2 inches across, dull tawny, convex, pulverulent in the centre, fibrillose towards the margin; stem 1¾ inch high, ¼ thick, of the same colour, even; ring descending, moveable; gills 1½–2 lines wide, ventricose, straw-coloured, attenuated behind, approximate; spores broadly ovate, ·00025′ long.

Differs at once from all the forms of *A. erythrogrammus* in the different nature of the ring.

14. A. (LEPIOTA) LEPIDOPHORUS, *B. & Br.* Pileo e campanulato papillato-umbonato plano subcarnoso obtuso squamulis minutis obsito; stipite sursum attenuato farcto; annulo mobili; lamellis ventricosis approximatis citrinis (no. 36, cum icone) (no. 882).

On the ground. Peradeniya, Nov. 1869.

Pileus an inch or more across, campanulate, umbonate, then plane obtuse and slightly umbonate, white, clothed with minute reddish scales, striate when dry; stem 1½ inch high, 1½ line thick in the centre, stuffed, pinkish; ring entire, cup-shaped, moveable; gills 1 line broad, ventricose, lemon-coloured, rounded behind, approximate; spores ·000$\dot{3}$′ long. Whole plant acquiring a yellowish tinge in drying, and staining the paper bright yelllow.

b. No. 883. "Gills soon turning green when drying. Stem very pale ferruginous."

15. A. (LEPIOTA) ERYTHROGRAMMUS, *B. & Br.* Pileo plano umbonato vinoso lituris fibrosis concoloribus notato; stipite e basi claviformi sursum attenuato candido glabro albo-farcto; annulo submobili, lamellis ventricosis approximatis (no. 1202, cum icone).

On the ground. July 1869.

Pileus 1¾ inch across, plane, umbonate, vinous, marked with radiating fibrillose lines; stem 2 inches high, nearly ¼ inch thick in the centre, smooth, stuffed; gills 2 lines broad, white, ventricose, approximate; spores ·00025′ long, much broader than in *A. alborusseus*.

b (no. 1187, cum icone) is a very pretty variety, of a bright brick-red, as is the edge of the erect ring.

c (no. 1159, cum icone) is a large variety, in which the fibres are more inclined to be disposed in scales, the pileus more campanulate, with little or no umbo, coloured as in *b*, the ring somewhat moveable, with its edge clothed like the pileus.

16. A. (Lepiota) œnopus, *B. & Br.* Pileo late campanulato papillato-umbonato membranaceo sulcato squamulis paucis superficialibus albis obsito; stipite clavato extus intusque rubro, annulo medio persistente; lamellis latissimis ventricosis ascendentibus postice attenuatis approximatis (no. 688* cum icone).

On dead wood. Peradeniya, Nov. 1868.

Pileus 2¼ inches across at the base, 1½ inch high, white, campanulate sulcate, with a few scattered nearly white superficial scales; the extreme nipple-like umbo red; stem 3 inches high, 1½ line thick in the centre, clavate, solid, red within and without, smooth; ring central, white; gills ⅓ inch wide, white, ventricose, strongly attenuated behind, approximate; spores ·0003′–·0004′ long.

17. A. (Lepiota) adoreus, *B. & Br.* Niveus; pileo campanulato subcarnoso latissime papillato-umbonato, umbone centro depresso, striato particulis furfuraceis obsito; stipite clavato grumoso-farcto, annulo angusto; lamellis arcuatis utrinque attenuatis remotis (no. 688 cum icone).

On the ground. Nov. 1868.

Pileus 1 inch broad and high; stem 3 inches high, flexuous, 1½ line thick in the centre; gills nearly 2 lines wide.

18. A. (Lepiota) leontoderes, *B. & Br.* Pileo convexo umbonato fulvo verrucis paucis pallidis insperso; stipite e basi truncata sursum attenuato maculato sursum liturato e farcto cavo, annulo descendente lacerato fugaci lamellisque latis postice rotundatis approximatis pallidioribus (no. 1200 cum icone).

On the ground. Peradeniya, July 1869.

Pileus 2½ inches across, convex, umbonate, tawny, minutely tomentose, with a few scattered warts; stem 3 inches high, ¼ inch thick in the middle, truncate at the base, where there are a few transverse tawny scales, marked above with tawny streaks, stuffed, then hollow; gills ¼ inch wide, ventricose, rounded, or sometimes slightly attenuated behind, very pale tawny; spores ·0003′ long. The flesh is so tender that the warts seem sunk into the substance when dry, as in an allied Cuban species *A. hemisclerus, B. & C.*

19. A. (Lepiota) cepæstipes, *Sow.* (No. 1154 cum icone.) *Gardner*, no. 47.

Amongst decayed herbs. Nov. 1867, July 1869.

"Densely clustered, of a beautiful yellow, base of stipes tinged with orange."

The plant of Nov. 1867 is a variety with an equal stem, such as occurs occasionally in our hothouses.

20. A. (Lepiota) licmophorus, *B. & Br.* Pileo plano depresso membranaceo citrino plicato-sulcato, margine crenato; stipite gracili sursum attenuato fistuloso citrino; lamellis arcuatis distantibus candidis remotis (no. 758 cum icone).

On the ground. Peradeniya, Sept. 1868.

Pileus 1 inch across, lemon-coloured, membranaceous, deeply plicato-sulcate up to the central disk, margin crenate; stem $3\frac{1}{2}$ inches high, attenuated upwards, lemon-coloured, 1 line thick in the centre, fistulose, truncate at the base; ring about halfway up; gills distant, slightly arched, remote, interstices veined; spores lemon-shaped, ·0005′ long.

This species, like the former, occurs occasionally in our hothouses. It is probable that they were originally introduced with exotic plants, as they never occur in the open air. The species approaches very closely to Fries's genus *Hiatula*.

21. A. (Lepiota) pselliophorus, *B. & Br.* Pileo plano depresso carnoso fusco diffracto-maculato, margine arcuato, stipite crassiusculo armillato solido; annulo descendente amplo striato; lamellis ventricosis pallidis postice rotundatis approximatis (no. 798 cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus $1\frac{3}{4}$ inch across, plane, depressed, brown-spotted from the breaking up here and there of the cuticle, margin repand; flesh thick, white; stem $1\frac{1}{2}$ inch high, $\frac{1}{3}$ inch thick, solid, clothed with transverse rings of scales; ring white, broad, descending, striate from the impression of the gills; gills white, $\frac{1}{4}$ inch wide, ventricose, rounded behind, approximate; mycelium white.

22. A. (Lepiota) thrombophorus, *B. & Br.* Pileo conico albo squamis grumosis brunneis obsito, margine fisso; stipite subæquali furfuraceo, annulo amplo descendente; lamellis angustis utrinque attenuatis candidis (no. 903 cum icone).

On the ground. Jan. 9, 1869.

Pileus $\frac{3}{4}$ inch wide, beset with dark brown grumous scales; stem 1 inch high, 1 line thick, smooth, reddish; ring descending, ample; gills scarcely $\frac{3}{4}$ line broad, attenuated at either end, white, approximate; spores ·0005′ long.

No. 923 appears to be a variety with more pilose scales and broader ventricose gills. The spores agree exactly. Allied to *A. albo-russeus*.

23. A. (Lepiota) rhyparophorus, *B. & Br.* Pusillus; pileo con-

vexo subumbonato sulcato-striato albo maculis fuscis obsito; stipite clavato, annulo descendente; lamellis angustis postice attenuatis approximatis (n^{is} 1199, 887 cum iconibus).

On the ground. Jan. July 1869.

Pileus convex, slightly umbonate, ⅔ inch across, white, sulcate, spotted with dark brown patches; stem ½–1 inch high, reddish, smooth, clavate, stuffed; ring narrow, descending; mycelium thread-like; gills ½ line wide, attenuated behind, white, distant, approximate; spores oblong, ·0002′ long.

No. 885 (cum icone), Peradeniya, Sept. Nov. 1869, is a plane form with the stem 1¼ inch high and nearly equal; gills 1 line, wide, pinkish; spores ·0002′ long.

No. 953 is a still taller form with a well-developed ring; spores same length.

In some respects resembles the last species, but the spores are very different.

24. A. (LEPIOTA) PHLYCTANODES, *B. & Br.* Convexo obtuso carnoso verrucoso, margine squamoso; stipite æquali fibrilloso-farcto, annulo amplo descendente; lamellis ventricosis approximatis (no. 820, 1173 cum iconibus).

On the ground or decaying vegetable matter. Peradeniya, Nov. 1868, June 1869.

Pileus 1–2 inches across, plano-convex, broadly umbonate or obtuse, clothed above with reddish-brown erect warts, and towards the margin with fibrillose scales, flesh white with a slight pinkish tinge; stem 2 inches high, 2 lines thick, stuffed with white fibres, reddish within and without, slightly fibrillose; ring descending, ample; gills ventricose, 1 line wide, rounded behind, approximate; spores obliquely ovate, ·000$\dot{3}$′ long. Mycelium fibrous.

No. 1173* has the margin striate, and is cylindrical when young; stem slightly scaly toward the base. Gills not rounded behind.

We consider this a variety.

25. A. (LEPIOTA) PSEUDO-GRANULOSUS, *B. & Br.* Pileo subcampanulato estriato verrucis erectis et pulvere obsito; stipite clavæformi e farcto cavo, annulo amplo descendente; lamellis candidis angustis utrinque attenuatis (no. 823 cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 1 inch across, white, clothed in the centre with upright mealy warts, pulverulent towards the margin; stem 1½ inch high, 1 line thick in the centre, clavate, stuffed, then hollow, white, pulverulent; ring ample, white, descending; gills narrow, subremote; spores ·0002′ long.

No. 823* is a fawn-coloured form, with a narrower ring; stem fawn-coloured, villous, with deflexed hairs.

26. A. (Lepiota) muticolor, *B. & Br.* Pileo subcampanulato obtuso candido squamis fibrillosis rufis hic illic picto! stipite clavato albo, deorsum rufulo albo-farcto, annulo amplo descendente; lamellis utrinque attenuatis approximatis (no. 714 cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus 1 inch across, subcampanulate, obtuse, white, clothed, especially in the centre, with minute fibrillose rufous scales; stem 2½ inches high, nearly 2 lines thick, clavate, white with a slight rufous tint below; ring descending; gills 1½ line wide, attenuated at either extremity, slightly tinged with red; spores ·0002′ long.

Allied to *A. metabolus.*

27. A. (Lepiota) biornatus, *B. & Br.* Pileo convexo carnoso sericeo squamulis punctiformibus rubris insperso estriato; stipite maculato e farcto cavo maculato, radicante, annulo descendente; lamellis ventricosis albis approximatis (no. 1168 cum icone).

On the ground. Peradeniya, July 1869.

Cæspitose; pileus 2 inches across, broadly campanulate, white, silky, with scattered minute dark-red scales, fleshy; flesh white or slightly tinged with yellow; stem oblique, 4 inches high, ⅓ inch thick, attenuated at the base, rooting, spotted with red, reddish within, stuffed, then hollow; ring descending, spotted at the edge like the pileus; gills 2 lines broad, white, ventricose, approximate; spores ·0004′ long by ·0003′.

Like *A. rubricatus*, the whole plant becomes dark in drying.

28. A. (Lepiota) parœnus, *B. & Br.* Pileo convexo albido piloso-squamoso; stipite clavato fibrilloso farcto, annulo descendente fugaci; lamellis arcuatis (no. 788).

On the ground. Nov. 1868.

Pileus 2–2½ inches across, convex, dirty white, the surface broken up into pilose scales; stems 2 inches high, 2 lines thick in the centre, ring descending, fugacious; gills arcuate, attenuated behind; spores ·0002′ long. Whole plant, but especially the gills, when dry, becoming of a deep vinous red.

No. 914. A white or reddish grey form, with brown speckles.

No. 876. Whole plant reddish grey with minute scales. Dec. 1868.

29. A. (Lepiota) macrocolus, *B. & B.* Eximie cæspitosus; pileo e campanulato late umbonato convexo carnoso squamulis pilosis ex-

asperato; stipite longissimo farcto glabro, annulo erecto lacerato; lamellis utrinque attenuatis approximatis (no. 843 cum icone).

On the ground. Peradeniya, Dec. 1868.

Densely gregarious; pileus 1–1½ inch across, at first campanulate, with a large nipple-shaped umbo, white, epidermis straw-coloured, broken up into pilose scales, fleshy; flesh red when cut; stem 6 inches or more high, 2 lines thick, smooth; ring ragged, erect; gills arcuate, attenuated at either end, approximate, pale straw-coloured; spores ·0002′ long. Whole plant red when dry.

30. A. (LEPIOTA) COLUMBICOLOR, *B. & Br.* Pileo convexo umbonato sericeo-notato; stipite subbulboso sursum attenuato albo-farcto, annulo erecto angusto; lamellis arcuatis angustis postice attenuatis carneis (no. 1208 cum icone).

On the ground. June 1869.

Dove-coloured; pileus ¾ inch across, convex, umbonate, marked with little silky specks; flesh grey; stem 1½ inch high, 1 line thick in the centre, slightly bulbous, grey within, stuffed with white; ring narrow, erect, ascending; gills ¾ line broad, pink, attenuated behind, approximate; spores oblong, ·00025′ long.

This species, with some others, approaches *Psalliota*. The whole plant becomes dark in drying; and the slight vinous tint of the spores arises probably from the same circumstance.

31. A. (LEPIOTA) VIRIDI-TINCTUS, *B. & Br.* Olidus; pileo convexo umbonato albo squamulis rufis obsito; stipite claviformi e farcto cavo glabro albo basi rufescente; lamellis ventricosis postice attenuatis approximatis (no. 1153 cum icone).

On the ground. June 1869.

Smell foxy; pileus 1 inch across, convex, umbonate, white, clothed with dense, rufous, pilose scales; stem 2 inches high, 1 line thick in the centre, clavate, stuffed, then hollow, smooth; ring erect; edge rufous; gills white, ventricose, attenuated behind, 1 line wide; spores ·0002′ long.

Turns of a greenish blue when cut.

32. A. (LEPIOTA) APALOCHROUS, *B. & Br.* Pileo e convexo depresso tenui, centro fusco-notato, margine sulcato; stipite subæquali glabro radicante candido, annulo medio erecto; lamellis arcuatis postice rotundatis remotis candidis (no. 1213 cum icone).

On the ground. Peradeniya, June 1869.

Pileus more than 1 inch across, thin, white, with a few brown dots at the apex; margin deeply sulcate; stem 1¼ inch high, 1½–2 lines thick, smooth, white, stuffed, rooting; ring erect; gills white, arched, 1½ line wide, rounded behind, remote; spores oblong, ·00025′ long.

A very delicate species.

33. A. (Lepiota) albo-russeus, *B. & Br.* Pileo campanulato late umbonato rubro-fusco in lituras fibrillosas rupto, carne alba; stipite e basi clavata attenuato albo-farcto, annulo erecto; lamellis ventricosis crenatis (no. 1183 cum icone).

On the ground. Peradeniya, June 1869.

Pileus 1½ inch across, campanulate, with an obtuse umbo, then expanded, subcarnose, of a rich red-brown, broken up into radiating fibrillose lines; stem 2½–3 inches high, white, slightly furfuraceous below, stuffed; ring erect; gills white, ventricose; spores clavate, ·00025′ long.

34. A. (Lepiota) pyrocephalus, *B. & Br.* Pileo convexo aurantio-rubro squamulis punctiformibus obsito; stipite gracili elongato, annulo erecto medio; lamellis angustis postice attenuatis (no. 772).

On the ground. Peradeniya, Sept. 1868.

Pileus 1 inch across, convex, orange-red, darker in the centre, beset with minute scales; stem 2 inches high, 1 line thick, stuffed, rim white, thin, erect, fugitive; gills narrow, very slightly ventricose, attenuated behind; spores elongated, ·00035′ long, white.

35. A. (Lepiota) flavido-rufus, *B. & Br.* Gregarius, decolorans; pileo conico papillato-umbonato, epidermide diffracta; stipite gracili, annulo erecto demum lacero (no. 724).

On grass. Peradeniya, July 1868.

"Dull reddish yellow;" pileus ¾–1 inch across, convex, with a large papillæform umbo, the surface broken up into little areolæ; stem 2½ inches high, nearly equal, ring at first erect; spores pallid, ·00025′. Whole plant, when dry, dull umber.

36. A. (Lepiota) epicharis, *B. & Br.* Pileo conico obtuso albo estriato squamulis punctiformibus rubris fibrillosis notato; stipite flexuoso clavato, deorsum cærulescente, farcto, annulo erecto; lamellis ventricosis stramineis approximatis (no. 1161 cum icone).

On the ground. July 1869.

Pileus 1 inch across, white, estriate, conical, obtuse, marked with little red scales, flesh thickish in the centre; stem 2 inches high, 1 line thick, slightly clavate, white, tinged below with blue; ring erect, distant; gills straw-coloured, ventricose, slightly attenuated behind, approximate. Spores ovate, ·00025′ long. Whole plant becoming tawny when dry, and the pileus grooved.

Allied to *A. carphophyllus*; but the ring is different, in addition to other characters.

37. A. (Lepiota) spodolepis, *B. & Br.* Pileo e conico depresso albo, epidermide brunnea in squamulas fibrillosas rupta; stipite clavato deorsum rufescente farcto, annulo erecto; lamellis ventricosis distantibus approximatis (no. 886 cum icone) (no. 884).

On the ground. Peradeniya, Oct. Dec. 1868.

Pileus ¾ inch across, conical, then depressed, white, epidermis dark brown, broken up into minute fibrillose scales; stem 1 inch high, 1 line thick, clavate, smooth, white, becoming rufous towards the base, stuffed, ring erect, edge brown; gills 1 line wide, distant, white, ventricose, approximate. Spores ·00025′ long.

Undoubtedly closely allied to *A. erythrogrammus*; but the gills are far more distant; no. 886* is a small form resembling *A. rhyparophorus*, and decidedly umbonate.

38. A. (LEPIOTA) MICROPHOLIS, *B. & Br.* Pileo conico albo squamulis minimis cinereis ornato striato; stipite flexuoso albo subæquali, annulo erecto; lamellis candidis ventricosis confertis approximatis, (no. 906 cum icone).

On the ground. Jan. 1869.

Pileus not ¾ inch across, conical, white, covered in the centre with very minute cinereous scales, margin striate; stem 1 inch high, about ½ line thick, nearly equal, white; ring erect; gills ½ line wide, crowded, slightly ventricose. Spores ·0002′ long.

No. 779 is a dull white or reddish-grey form, with the stem very pale ferruginous; nos. 908, 909 appear to give two varieties of the same species.

39. A. (LEPIOTA) EAROCHROUS, *B. & Br.* Pileo convexo roseo pulverulento-granuloso; stipite gracili deorsum rufescente, annulo erecto; lamellis pallide carneis postice rotundatis approximatis (no. 893 cum icone).

On the ground. Dec. 1868, Jan. 1869.

Pileus ½–¾ inch across, at first subconical, then convex, rose-coloured, minutely granulated; stem 1 inch high, ½ line thick, stuffed, white, changing below to rufous, red within, nearly equal; ring erect, edge coloured; gills ventricose, rounded behind, pink. Spores oblong, ·00025′ long.

A very pretty little species, resembling, when fresh, some forms of *A. granulatus*, becoming very dark in drying.

40. A. (LEPIOTA) ANTHOMYCES, *B. & Br.* Pileo convexo candido membranaceo pulverulento usque ad discum striato; stipite gracili candido hic illic rubro-maculato e strato pulverulento oriundo, annulo erecto; lamellis angustis ventricosis postice rotundatis (no. 888 cum icone).

On decayed vegetable matter. Peradeniya, Dec. 1868, Jan. 1869.

Pileus ¾ inch across, white, convex, striated up to the disk, which is tinged with red, pulverulent; stem 1¼ inch high, ¾ line thick, flexuous, white, here and there stained with red, stuffed, springing from a white powdery stratum; ring erect; gills slightly ventricose, rounded behind, ¾ line broad. Spores slightly oblong, ·0002′ long.

A very pretty and distinct species.

41. A. (Lepiota) opshæmatus, *B. & Br.* Pileo plano acute umbonato usque ad umbonem striato pallide carneo; stipite æquali, annulo erecto; lamellis carneis falciformibus postice rotundatis approximatis (no. 891 cum icone).

On the ground. Dec. 1868.

Pileus ¾ inch across, plane, acutely umbonate, striate up to the red-brown umbo; stem ¾ inch high, ½ line thick; ring erect; gills falciform, rounded behind, flesh-coloured. Spores ovate, ·0002′ long.

The whole plant becomes of a deep vinous-red when dry.

42. A. (Lepiota) spongodes, *B. & Br.* Pileo convexo subcarnoso sericeo-squamoso; stipite flexuoso lanato farcto, annulo suberecto; lamellis arcuatis postice rotundatis remotis (no. 86 cum icone).

On the ground. Peradeniya, Nov. 1867.

Pileus 2 inches across, convex or somewhat conical, at length depressed, vinous-red, clothed with silky scales; flesh white, thin towards the margin; stem 2½ inches high, 2 lines thick, slightly attenuated upwards, vinous; gills 2–2½ lines wide, arched, white, with a pinkish tinge, leaving a circular space round the top of the stem, which does not penetrate the flesh; mycelium fibrous; spores ·00025′ long.

This description is taken from the specimen from which the drawing was made. There is, however, a specimen marked with the same number, which may possibly be distinct, though the spores are similar. The pileus is still more spongy, the stem shorter and dilated at the base; and, when dry, the coating of the pileus assumes the colour of sponge.

43. A. (Lepiota) dasypeplus, *B. Lond. Journ. of Bot.* vol. vi. p. 482; *Gard.* no. 63.

On old wood. Hautane, Ceylon.

44. A. (Lepiota) albuminosus, *B. l. c.* tab. xx. fig. 3; *Gard.* no. 51.

On the ground. Peradeniya, June 1844.

45. A. (Lepiota) lignyodes, *B. & Br.* Pileo hemisphærico carnoso stipiteque curto albo-farcto fuligine rubro fuscescente aspersis; annulo lacero appendiculato; lamellis ventricosis approximatis (no. 745 cum icone).

On the ground. Peradeniya, Sept. 1868.

Pileus 1½ inch across, convex, clothed, as is the stem, with mulberry-red powder, which assumes a sooty tint in drying; flesh thick, white; stem ¾ inch high, 2 lines thick, at first stuffed with white, furfuraceous (or nearly smooth, no. 745* cum icone), then hollow, gills ventricose, attenuated behind, approximate, or in the variety much broader and rounded behind; spores subglobose, ·0003′ long.

In no. 745* the edge is not appendiculate.

46. A. (LEPIOTA) MANICATUS, *B. & Br. in Linn. Trans.* xxvii. p. 150, tab. 33*b* (no. 691 cum icone).

On the ground. Peradeniya, July 1868.

47. A. (LEPIOTA) MYXODICTYON, *B. & Br.* Pileo hemisphærico umbrino muco concolori reticulato carnoso; stipite æquali solido albo deorsum fibrilloso; cortina spongiosa; lamellis falciformibus approximatis albidis (no. 793 cum icone).

On the ground. Nov. 1868.

Pileus 2½ inches across, convex, broadly and very obtusely umbonate, dark umber, clothed with a network of similarly coloured mucus; flesh thick, reddish beneath the cuticle; stem 2½ inches high, 5 lines across, solid, nearly white, clothed above with a spongy ring, fibrillose below; gills ¼ inch broad, sickle-shaped, approximate, slightly tinged like the flesh with red.

Allied to *A. gliodermus*, Fr.

48. A. (LEPIOTA) EUCONIATUS, *B. & Br.* Pileo convexo carnoso albo pulvere vinoso obsito estriato; stipite sursum attenuato albo pulverulento farcto; lamellis ventricosis postice rotundatis remotis (no. 818 cum icone).

On rotten wood. Peradeniya, Nov. 1868.

Pileus 3 inches or more across, convex, covered with little patches of vinous dust; stem 4 inches high, ⅓ inch thick, attenuated upwards, pulverulent like the pileus, stuffed, sometimes rooting; ring not distinct from the meal of the stem; gills slightly ventricose, ¼ inch wide; spores oblong, ·00015′–·0002′ long.

Flesh thick, except towards the margin, white; the white inner substance of the stem continued into the obtuse apex. Spores white; but there is a close affinity with *A. cretaceus.* Sometimes part of the stem is naked, sometimes the whole is mealy and less distinctly stuffed.

49. A. (LEPIOTA) GRANULOSUS, *Batsch.* (No. 1149 cum icone.)

On earth, in flower-pots. June 1869.

A minute form clothed with red granules. Spores ·0002′ long.

No. 901 (cum icone) Jan. 1869, is a larger form, with stem and pileus more or less clothed with brownish granules, the gills sharply rounded behind, and one of an intermediate size, with the granules darker and conspicuous at the base of the stem as well as pileus.

No. 902 (cum icone) comprises two varieties, one with cinereous patches on the pileus and base of the stem, and the other with a smooth skin. The spores are similar in all.

50. A. (LEPIOTA) CERAMOGENES, *B. & Br.* Pusillus, stramineus; pileo e campanulato convexo umbonato glabro vel parce granuloso margine appendiculato; stipite brevi, annulo fugaci; lamellis ventricosis candidis approximatis (no. 1191 cum icone).

On the soil of flower-pots. June 1869.

Pileus 2–3 lines across, campanulate, then plane and umbonate, straw-coloured, smooth, or slightly granulated, margin appendiculate, even; stem $\frac{1}{3}$ inch high, $\frac{1}{3}$ line thick, having a few fragments of the ring above; gills white, ventricose, $\frac{1}{2}$ line wide; spores oblong, ·00025′ long. The gills turn red in drying.

This is a very distinct species from *A. floralis*, B. & C., which has totally different spores.

51. A. (LEPIOTA) PYRRHAES, *B. & Br.* Pileo convexo obtuso verruculis lateritiis obsito; stipite sublateritio farcto deorsum plus minus granulato; lamellis latis carneis postice rotundatis approximatis (no. 1163 cum icone).

On the ground. June 1869.

Pileus $\frac{1}{3}$ inch across, obtuse or broadly umbonate, clothed with brick-red granules; stem $\frac{3}{4}$ inch high, 1 line thick, stuffed, equal, mostly paler than the pileus, more or less scaly, smooth above, more rarely quite smooth, red within; gills 1 line wide, ventricose, rounded behind, flesh-coloured; spores ovate oblong, ·0003′ long.

There is a form (no. 1163* cum icone) strongly umbonate, the stem more scaly, the gills narrower, paler, and not so ventricose or rounded behind.

52. A. (LEPIOTA) ERYTHROSTICTUS, *B. & Br.* Pileo ex ovato hemisphærico lilacino cuticula in particulas concolores rupta; stipite lilacino e farcto cavo deorsum furfuraceo; lamellis leviter ventricosis approximatis; sporis elongatis (no. 755 cum icone).

On the ground. Peradeniya, Sept. Dec. 1868.

Pileus 1 inch across, at first ovate, lilac, with the cuticle, which is at first continuous, broken up into little darker specks; flesh tinged with pink; stem 1–1$\frac{1}{2}$ inch high, springing from radiating threads, furfuraceous below the fugitive ring, or striate reddish, stuffed, the fibres at last forming a slender cord; gills ventricose, 1$\frac{1}{4}$ line broad, white, rounded behind, approximate; spores oblong, narrow, ·0003′ long, without any nucleus, or ·00025′ with a nucleus.

53. A. (LEPIOTA) RUSSOCEPS, *B. & Br.* Pileo e campanulato plano-convexo fulvo pulverulento-maculato estriato, stipite subæquali pallidiore farcto; lamellis pallidis ventricosis approximatis (no. 1151 cum icone).

On the ground. June 1860.

Pileus ¾ inch across, at first subcampanulate, then plano-convex, umbonate, tawny, rough, with little pulverulent specks: stem flexuous, nearly equal, 1½ inch high, nearly 1 line thick, tawny, stuffed with white; gills more than a line broad, ventricose, slightly tinged with tawny; spores oblong, 0003′ long.

Allied to the last, but, judging from the dried specimens, apparently distinct.

54. A. (LEPIOTA) POLYGLOMUS, *B. & Br.* Pileo subhemisphærico verrucis erectis pallidis obsito; stipite recto rufo furfuraceo albo-farcto; lamellis latis postice truncatis rufulis (no. 907 cum icone).

On the ground. Jan. 1869.

Pileus 1 inch across, subhemispherical, pale, clothed, especially in the centre, with erect pyramidal warts; stem 1–1¼ inch high, 1 line thick, nearly equal, reddish, stuffed, furfuraceous; gills nearly 2 lines broad, truncate and sinuated behind, dark-rufous when dry; spores ·0002′ long.

Allied to *A. granulosus.*

55. A. (LEPIOTA) CITROPHYLLUS, *B. & Br.* Pileo obtuso vel late umbonato demum depresso citrino squamulis variis rufis obsito; stipite citrino e farcto cavo squamuloso; lamellis ventricosis postice rotundatis vel attenuatis approximatis citrinis (no. 821 cum icone).

On the ground. Peradeniya, Nov. 1868. Jan. 1869.

Several forms of this species occur:—

a. Campanulate, with transverse scales on the pileus, and a squamulose stem attenuated and slightly rooting at the base, or abrupt, with the scales less decidedly transverse, and the gills attenuated behind.

b. Pileus plane, then depressed, the margin striate, slightly squamulose in the centre or dotted; stem reddish without and within, gills rather remote, rounded behind, broad (no. 824 cum icone).

c. Pileus hemispherical, minutely squamulose; stem smooth, even, rather sunk into the pileus; gills rounded behind, here and there tinged with green (no. 1174 cum icone). This looks more distinct than the others.

d. Pileus convex, strongly umbonate; stem fibrillose, dilated at the base; gills rounded behind. In all the spores are obliquely ovate, 0003′ long (no. 1188 cum icone).

e. Pileus campanulate, broadly umbonate, floccose; gills attenuated behind, yellow. No. 882 stains even the gum with which it is fastened bright yellow.

No. 881. Peradeniya, Oct. 1868.

"Yellowish, clouded with ferruginous; gills yellow," seems to differ from the rest in more oblong spores, ·00025′ long.

Nearly allied to *A. lepidophorus,* but the general appearance of the dried plant is very different. All stain the paper in which they are dried with a yellow tint.

56. A. (Lepiota) plumbicolor, *B. & Br.* Pileo plano late umbonato plumbeo verrucis erectis ornato; stipite flexuoso deorsum maculato albo-farcto; lamellis ventricosis postice subsinuatis pallide carneis (no. 864 cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus 1 inch across, plane, broadly umbonate, lead-coloured, clothed with dark warts, which pass into scales on the margin; stem 1½ inch high, 1 line thick, flexuous, lead-coloured, spotted at the base; ring white, consisting of a little down; gills 1 line broad, pale flesh-coloured; spores obliquely ovate, ·0003′ long.

57. A. alopochrous, *B. & Br.* Pileo e subcampanulato convexo fulvo villoso squamuloso; stipite gracili fibrilloso tomentoso concolori; lamellis latis ventricosis approximatis; sporis oblongis (no. 924).

On the ground amongst fallen vegetable remains. Peradeniya, Dec. 1868.

Pileus ¾ inch across, at first subcampanulate, obtuse, then convex, tawny, clothed with minute villous scales; stems 1½ inch high, ½ line thick, fibrillose and tomentose, of the same colour; gills 1½ line broad, ventricose; spores oblong, ·00025′ long.

58. A. (Lepiota) revelatus, *B. & Br.* Pileo convexo umbonato subter cuticulam brunneam laceratam striato; stipite subæquali e farcto cavo deorsum squamoso-punctato, sursum glabro; lamellis latiusculis ventricosis candidis (no. 922 cum icone, no. 910).

On the ground. Peradeniya, Jan. 1869.

Pileus 1¼ inch across, convex, umbonate, white, striate beneath the brown even torn cuticle; stem 1½ inch high, 1½ line thick, oblique, nearly equal, stuffed, then hollow; spotted below, white above; gills 2 lines wide; spores oblong, ·00025′ long.

59. A. (Lepiota) pardalotus, *B. & Br. in Linn. Tr.* xxvii. p. 150 (no. 693 cum icone).

On the ground. Peradeniya, July 1868.

60. A. (Lepiota) rhacoderma, *B. & Br.* Pileo depresso striato; epidermide brunnea mox lacerata; stipite solido albo; lamellis latis carneis (no. 867 cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus 1¼ inch across, depressed, thin, striate beneath the brown cuticle, which is soon broken up into various-sized patches; stem 1 inch high, nearly equal, solid, white; gills nearly two lines broad, ventricose, approximate, flesh-coloured; spores ·0003′ long.

The solid not obviously stuffed stem seems characteristic of this little species. This and *A. rhyparophorus* and *A. revelatus* resemble each other externally as regards the pileus; but the spores are different.

61. A. (LEPIOTA) ALPHITOCHROUS, *B. & Br.* Pileo e campanulato plano subumbilicato subter epidermidem lævem separabilem particulis farinosis candidis obsito; stipite æquali farcto farinoso; lamellis ex albo sordide carneis postice rotundatis (no. 771 cum icone).

On the ground. Peradeniya, Sept. Nov. 1868.

Pileus 2 inches across, campanulate, then expanded, plane, slightly umbilicate, at first clothed with a smooth brownish cuticle, which peels off, except at the apex, where it forms a little cup with free edges, leaving a pale flesh-coloured stratum scattered with white mealy specks and striæ towards the margin; stem 1½ inch high, 2½ lines thick, white, mealy like the pileus; ring appendiculate; gills 1½ line wide, rounded behind, at first white, than dull red; spores ·0002′–·00025′ long.

Whole plant red when dry.

No. 849 appears to be a very pale form: stem 5½ inches high, "dull ochraceous gilvous, with pileus and base of the stem pale ferruginous."

62. A. (LEPIOTA) FLAGELLATUS, *B. & Br.* Pileo e subcampanulato umbonato plano, squamulis liturisve rubris notato; stipite sursum dilatato glabro farcto; lamellis latis falciformibus pallide stramineis (no. 837 cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 1–1½ inch across, subcampanulate, umbonate, then plane, white, marked with little red scales or streaks, bearing the powdery remains of the veil on the margin; stem 1½ inch high, 2 lines thick in the middle, obversely conical, white, at length stained below with brown, reddish within; gills broad, 2–2½ lines wide, falciform, pale straw-coloured, approximate; spores persistently white, ·0002′ long.

Whole plant dark when dry, but not of so vinous a tint as in allied species, nor do the spores change colour.

63. A. (LEPIOTA) HEMICHLORUS, *B. & Br.* Gregarius; pileo semiovato stramineo squamulis minutis insperso subcarnoso; carne rubro tincta; stipite gracili rufulo albo-farcto; lamellis arcuatis postice attenuatis rufulis (no. 1160 cum icone).

On the ground. July 1869.

Pileus half-ovate, ¾ inch high, straw-coloured, clothed with minute scales; stem 2 inches high, 1 line thick, pale rufous without and within; ring subpersistent towards the apex; gills 1 line wide, arched, attenuated behind, approximate, pale rufous; spores ovate, ·0002′ long.

Whole plant dark red in drying.

64. A. (LEPIOTA) METABOLUS, *B. & Br.* Pileo plano citrino fibrillis brunneis picto; stipite basi truncato sursum attenuato rubro-lineato candido; lamellis ventricosis candidis remotis (no. 1186 cum icone).

On the ground. June 1869.

Whole plant tinged with red when bruised. Pileus nearly 1½ inch across, plane, lemon-coloured, marked with brown fibrillæ, which sometimes are disposed in scales; stem 1½ inch high, thickened and truncate at the base, where it is marked with red streaks, attenuated and white upwards; gills 2 lines broad, white, ventricose, remote; spores ·00025′ long.

65. A. (LEPIOTA) ŒNOCEPHALUS, *B. & Br.* Pileo subhemisphærico vinoso centro obscuriore rimoso-areolato; stipite flexuoso pallidiore lineato basi brunneo farcto, intus carneque luteis; lamellis postice rotundatis subcarneis (no. 796 cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 1 inch across, hemispherical, obtuse, vinous, very dark in the centre, where it is areolate, flesh yellow; stem 1½ inch high, more than a line thick, marked with little vinous streaks, and yellow-brown at the base, stuffed, yellowish within; gills 1½ line broad, ventricose, rounded behind, approximate, white shaded with pink, stained when bruised; spores ·00015′–·0002′ long.

Whole plant dark when dry, the gills acquiring a deep red tint. Approaching, like some others, very closely to *Psalliota.*

66. A. (LEPIOTA) PUNGENS, *B. & Br.* Pileo convexo carnoso fusco-ferrugineo appendiculato; stipite æquali farcto concolori; lamellis livide cæruleo-purpureis (no. 781).

On the ground. Nov. 1868.

Pileus 1 inch across, sometimes umbonate, fleshy; stem 1 inch high, 1½ line thick, stuffed; spores pale, ·0002′ long. Odour very pungent in drying. Dark when dry.

Other specimens are marked whitish, tinged with dark blue purple, Sept. 1868. Pileus pale dull purplish, Dec. 1868.

67. A. (LEPIOTA) METULÆSPORUS, *B. & Br.* Pileo campanulato obtuso sulcato squamulis pallidis ornato, margine appendiculato; stipite subæquali pallido intus citrino; lamellis ventricosis albis; sporis metulæformibus (no. 1180 cum icone).

On the ground. July 1869.

Pileus 1 inch across, campanulate, rather fleshy, white, grooved, adorned with small pallid scales; margin appendiculate; stem 2½ inch high, 1 line thick, nearly equal or slightly clavate, pallid, lemon-coloured, stuffed; gills nearly 2 lines broad, white, ventricose, approximate; spores ninepin-shaped, when seen from the back, obliquely clavate from the side, ·0006′ long. Mycelium thread-like.

This agrees, as to to the spores, with no. 6447 from Alabama, which is apparently a form of the same species, which occurs also in England.

No. 802, Peradeniya, Oct. 1868, described by Mr. Thwaites as fragrant, is the same species.

68. A. (Lepiota) lepricus, *B. & Br.* Pileo convexo centro verrucis pyramidatis margine depressis aspero; stipite clavæformi furfuraceo; lamellis ventricosis postice attenuatis (no. 820 in part).

On the ground. Peradeniya, Nov. 1868.

Pileus ¾ inch across, convex, clothed in the centre with pyramidal warts, those towards the margin depressed and transverse; stem 1–1½ inch high, clavate; gills ventricose, attenuated behind; spores ninepin-shaped, ·0005′ long.

Specimens mixed with *A. phlyctanodes.* Allied evidently to the last.

69. A. (Lepiota) eriphæus, *B. & Br.* Pileo convexo obtuso carnoso glabro; stipite elongato glabro farcto; annulo fugaci; lamellis ventricosis postice attenuatis approximatis (no. 836).

On the ground. Peradeniya, Oct. Nov. 1868.

Pileus 1½ inch across, white or very pale, ochraceous, convex, fleshy; stem 2–2½ inches high, 2 lines thick, smooth, white; gills white, densely crowded; spores ·0002′ long.

70. A. (Lepiota) aulacergates, *B. & Br.* Pallide testaceus; pileo campanulato umbonato delicato sulcato; stipite gracili; lamellis latis ventricosis interstitiis venosis (no. 720).

Pale testaceous; pileus 1½ inch across, campanulate, with an obtuse papillæform umbo deeply sulcato-plicate, up to the umbo minutely pulverulent; stem 1½ inch high, 1 line thick, equal: gills broad, ventricose, approximate; interstices venous; spores subglobose, white, ·0003′ long.

There is also a small form half the size, Dec. 1868.

71. A. (Lepiota) melichrous, *B. & Br.* Pileo hemisphærico umbonato pulverulento estriato; stipite gracili flexuoso pulverulento, annulo obsoleto; lamellis candidis (no. 743 cum icone).

On the ground. Peradeniya, Sept. 1868.

Gregarious: pileus not ½ an inch across, honey-coloured, pulverulent, as is the flexuous stem ½ inch high, ⅓ line thick; gills white, dark when dry; spores oblong, ·0002′ long.

72. A. (Armillaria) aspratus, *B. Lond. Journ. Bot.* vi. p. 481; *Gardner,* no. 50; *Thwaites* (no. 832 cum icone).

On the ground in shady places. Hautane range, June 1844.

Clarence River (*Mueller,* Carol. Inf. no. 1478). Peradeniya (on wood), Oct., Nov., Jan. Neilgherries, Sept. 1864, Aug. 1869 (*E. S. Berkeley*). Spores ·00035′–·0004′ long.

73. A. (ARMILLARIA) OMPNERUS, *B. & Br.* Candidus; pileo convexo carnoso fortiter umbonato pulverulento estriato; stipite æquali albo-farcto; annulo fugacissimo; lamellis angustis confertis approximatis (no. 1211 cum icone).

On the ground. June 1869.

Pileus 3 inches across, convex, fleshy, with a strong umbo, which is slightly tinged with umber, pulverulento-squamulose, becoming smooth; margin even; stem 2½ inches high, ¼ inch thick, smooth, white, umber at the base; ring very fugitive; gills white, 1 line broad, rounded behind, free, crowded, approximate.

The specimens are more delicate than those figured, which resemble in habit *A. xylophilus* (Weinm.). Spores ·00015′–·0002′ long.

74. A. (ARMILLARIA) RHODOMALUS, *B. & Br.* Pileo convexo subcarnoso pallide citrino verrucis punctiformibus frequentibus roseis obsito; stipite crasso subæquali farcto roseo-lineato; annulo superiore amplo lacerato citrino; lamellis angustis arcuatis postice attenuatis adnatis (no. 1212 cum icone).

On the ground. Peradeniya.

Pileus convex, 1 inch across, fleshy, pale lemon-coloured, sprinkled with minute rose-coloured warts; flesh nearly white; stem 1 inch high, ¼ thick, stuffed, obtuse, marked with rose-coloured lines, of the same colour within, except towards the centre; ring broad, descending, lemon-coloured, jagged; gills ¾ line broad, arched, attenuated behind, slightly adnate.

The colours are just those of *A. rutilans.*

75. A. (ARMILLARIA) EURHIZUS, *B. in Hook. Journ. Bot.* vi. p. 483; *Gard.* no. 43.

Peradeniya, June 1844, on the ground. Eaten by the Cingalese.

76. A. (TRICHOLOMA) RHACOPHORUS, *B. & Br.* Pileo convexo demum depresso carnoso innato-diffracto-fibrilloso estriato; stipite deorsum incrassato solido pallidiore squamis angustis fibrillosis rugoso; lamellis pallide stramineis postice rotundatis attingentibus (no. 1166 cum icone).

On the ground. July 1869.

Pileus nearly 3 inches across, convex, at length depressed, fleshy, dark-brown, rough with innate fibres or minutely cracked; flesh white; margin even; stem 2½ inches high, ½ thick, slightly thickened below, paler than the pileus, rough, with brown shred-like scales; gills pale straw-colour, 2½ lines broad, rounded behind and adnexed.

Allied to *A. impolitus.*

77. A. (TRICHOLOMA) CRASSUS, *B. in Lond. Journ. Bot.* vi. p. 483; *Gardner*, no. 53.

On the ground in shady places. Peradeniya, June 1844.

78. A. (TRICHOLOMA) PACHYMERES, *B. & Br.* Cæspitosus; pileo compacto convexo guttato ochraceo margine incurvo, carne crassa candida; stipite crasso squamoso tumido solido; lamellis subliberis arcuatis stramineis (no. 797 cum icone).

On the ground. Ambegamowa, Central Provinces, Nov. 1868.

Cæspitose; pileus 4 inches or more across, hemispherical, guttate; margin involute; flesh white, 1 inch thick: stem 4 inches high, attenuated upwards, swollen in the centre, where it is nearly 1½ inch thick, solid, clothed with small reflexed scales; gills arched, ¼ inch broad, rather attenuated behind and nearly free.

Allied to *A. gambosus*, and probably esculent. It differs from *A. crassus* in the even not sinuato-plicate margin, the scaly stem, and other characters. Grows, like that, to a large size.

79. A. (TRICHOLOMA) THEIOCHROUS, *B. & Br.* Sulfureus; pileo convexo umbonato carnoso: stipite subæquali farcto; lamellis angustis liberis vel breviter adnatis (no. 874 cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus ½–¾ inch across, convex, umbonate, sulphur-coloured, inclining to umber towards the umbo; flesh reddish; stem 1 inch high, 1 line thick, curved, nearly equal; gills narrow, rounded behind and free, or attenuated and slightly adnate; spores pale yellow, ·0002′ long.

There is a large form with no umbo when full-grown, and the gills slightly rounded behind and adnate. Allied to *A. chrysenterus.*

80. A. (TRICHOLOMA) RUBRO-CYANEUS, *B. & Br.* Pileo e conico plano depresso lilacino subtiliter virgato carnoso; carne alba; stipite obconico farcto fibrilloso albido; lamellis angustis candidis (no. 747 cum icone).

On the ground. Peradeniya, Sept. 1868.

Pileus 1¼–2 inches across, conical, obtuse, then convex, plane, or depressed, lilac, delicately virgate, fleshy; flesh white; edge at first involute: stem 1½ inch high, obconical, 2 lines thick in the centre, fibrillose, dirty white, stuffed; gills arched, narrow, shortly adnate, white.

Allied to *A. onychinus.*

81. A. (TRICHOLOMA) CHARISTERUS, *B. & Br.* Pileo plano umbonato carnoso lilacino, carne alba; stipite substricto basi attenuato e fibris radiantibus oriundo farcto; lamellis angustis leviter adnatis candidis (no. 847 cum icone).

Amongst dead leaves &c. Peradeniya, Dec. 1868.

About ½ an inch across, strongly umbonate, of a delicate lilac, slightly clouded; stem 1 inch high, 1½ line thick, stuffed, at length slightly hollow, attenuated at the base, where it springs from white radiating fibres; gills very narrow, white, slightly adnate.

Allied to *A. carneus.*

82. A. (TRICHOLOMA) NUDUS, *Bull.* t. 439; *Gardner*, no. 31; *Thwaites*, no. 203.

In damp shady places on the ground. June 1844, July 1868.

The specimens in general umbonate.

83. A. (CLITOCYBE) IOPEPLUS, *B. & Br.* Totus violaceus; pileo e convexo umbonato depresso striato; stipite subæquali striato; lamellis confertis angustis longe decurrentibus (no. 203).

On the ground. Peradeniya, Sept. 1868.

Pileus 2–3 inches across, at first convex, with a strong umbo, then depressed or almost cyathiform, margin striate; stem nearly equal or slightly thickened below, fibrillose, 2½–3 inches high, ¼ inch thick, solid; gills narrow, crowded, very decurrent.

Allied to *A. tyrianthinus.* Mycelium not red as in that species. It is, moreover, not nearly so robust.

84. A. (CLITOCYBE) CROCOBAPHUS, *B. & Br.* Flavus; pileo e convexo umbonato plano fulvo-virgato lævi; stipite subæquali e farcto cavo striato; lamellis angustis demum decurrentibus (no. 1176 cum icone).

On the ground. July 1869.

Pileus 3 inches across, at first convex, with a strong umbo adorned with tawny streaks, then nearly self-coloured and plane, margin even; stem 2½ inches high, ⅓ thick, stuffed, giving way in the centre, and at length hollow; gill 1½ line broad, arched, at first slightly rounded behind, then very decurrent.

Allied to *A. illudens.* Stems sometimes connate. Mycelium fibrous.

85. A. (CLITOCYBE) ANISUS, *B. & Br.* Pileo e convexo subunilaterali depresso infundibuliformique leviter floccoso; stipite elongato fistuloso; lamellis crassiusculis latis ventricosis decurrentibus (no. 381 cum icone).

On the ground. Peradeniya, Nov. 1868.

Cæspitose, straw-coloured; pileus 1 inch across, slightly floccose, at first convex, unequal, subunilateral, then umbilicate or infundibuliform; stem 2 inches high, 1 line thick, fistulose, very slightly thickened at the base, paler than the pileus; gills nearly 2 lines broad in the centre, ventricose, attenuated at either end, decurrent.

Allied to the following species. Spores ·0005′ long.

86. A. (CLITOCYBE) DIMORPHUS, *B. & Br.* Pileo convexo acute umbonato, dein umbilicato striato; stipite sursum dilatato solido v. fistuloso; lamellis candidis decurrentibus (no. 830, cum icone).

On the ground. Peradeniya, Nov., Dec. 1868.

Pileus ½–1 inch across, at first convex, with an acute umbo, lemon-coloured, streaked with darker lines, membranaceous, then umbilicate, retaining the umbo; stem ¾ inch high, strongly dilated upwards, solid, then fistulose, lemon-coloured; gills arched, decurrent, white or yellowish.

There appear to be two forms, a smaller, which is acutely umbonate and the stem solid, and a larger, with a decidedly fistulose stem and yellower gills. Spores ·0002′–·0003′.

87. A. (CLITOCYBE) METRIUS, *B. & Br.* Gilvus; pileo subcyathiformi angusto glabro; stipite elongato farcto; lamellis arcuatis breviter decurrentibus (no. 926).

On the ground. Peradeniya, Jan. 1869.

Pileus ¼ inch across, cup-shaped, with the margin arched, smooth; stem ¾–1 inch high, stuffed; gills narrow, arched, moderately distant, shortly decurrent; mycelium white, fibrous.

88. A. (CLITOCYBE) HYALODES, *B. & Br.* Hyalinus, fragilis, albus; pileo cyathiformi glabro estriato tenui; stipite deorsum attenuato fistuloso; lamellis angustissimis postice attenuatis (no. 805, cum icone).

On decaying vegetables, binding the soil with down. Peradeniya, Nov. 1868.

Hyaline, extremely brittle; pileus 2½ inches across, cup-shaped, smooth, very thin; stem 3½ inches high, ⅓ thick, flexuous, irregular, fistulose, attenuated at the base; gills not a line broad, attenuated behind, but not running down further than the top of the stem, where the hollow commences, above which the flesh is not thicker than above the gills; very dark when dry.

89. A (CLITOCYBE) CANDICANS, *P.* (No. 725, cum icone.)

On the ground. Peradeniya, Nov. 1868, Jan. 1869. Spores ·00025′ long.

90. A. (CLITOCYBE) EPIUS, *B. & Br.* Albus; pileo tenui e plano depresso stipiteque gracili glabris; lamellis angustissimis leviter decurrentibus (no. 947).

On the ground. Jan. 1869.

Pileus about 1 inch across, plano-convex, then more or less depressed, smooth, thin; stem 1–1½ inch high, 1 line thick, smooth; gills arched, slightly decurrent, ⅔ line broad. Whole plant ochraceous when dry.

91. A. (CLITOCYBE) CONSPURCATUS, *B. & Br.* Sordide albus, subtiliter tomentosus; pileo depresso tenui carnoso toto particulis lineis-

que sordidis rugoso; stipite subæquali striato; lamellis angustis decurrentibus (no. 1205).

On the ground.

Pileus 2½ inches across, depressed, thin but fleshy, obtusely umbonate—when dry, looking as if sprinkled with the dark excrement of some insect; stem 2 inches high, ¼ thick; gills not a line broad, decurrent.

A very singular species, of very uncertain affinity.

92. A. (CLITOCYBE) PYRACES, *B. & Br.* Pileo plano-depresso rufo, margine lævi inflexo; stipite deorsum attenuato ochraceo striato; lamellis distantibus crassis subconcoloribus (no. 722).

On the ground. Peradeniya, July 1868.

Pileus 1 inch across, plano-depressed, smooth, rufous, margin inflexed; stem 1½ inch high, striate, nearly ½ an inch thick, smooth, ochraceous; gills distant, pallid, shortly decurrent.

Somewhat resembling *A. irrufatus.*

93. A. (CLITOCYBE) MYOCHROUS, *B. & Br.* Pileo convexo obtuso pulverulento-tomentoso estriato; stipite tenaci insititio pallidiore apice candido intus deorsum cinerascente; lamellis albidis adnato-decurrentibus, interstitiis reticulatis (no. 1178, cum icone).

On dead sticks. July 1869.

Pileus ¾ inch across, convex, subcampanulate, mouse-coloured, clothed with pulverulent down, margin even; flesh white; stem 1 inch high, scarcely a line thick, solid, minutely velvety white above, cinereous within below; gills nearly horizontal, adnato-decurrent, nearly white, about 2 lines broad.

This species belongs to Fries's section *Versiformes.*

94. A. (CLITOCYBE) SPODOPHORUS, *B. & Br.* Rufulus; pileo subhemisphærico umbilicato flocculis nigris obsito membranaceo; stipite sursum dilatato solido flocculento; lamellis adnatis denticulo decurrente acie nigra serrulata (no. 1215, cum icone).

On the ground. Sept. 1869.

Pileus ½ inch across, subhemispherical, slightly umbilicate, beset with black flocculent specks, membranaceous; stem dilated upwards, solid, covered, especially above, with delicate black flocci; gills few, adnate, with a decurrent tooth; edge serrulate, marked with interrupted black specks. General colour dull flesh-colour.

Allied to *A. laccatus.*

95. A. (CLITOCYBE) LACCATUS, *Scop.* (no. 846). (No. 949, cum icone.)

On the ground in the higher forests of the Central Provinces. Oct. 1868.

"Deep sanguineous; gills reddish yellow, sometimes red."

No. 949 is a large form deeply and broadly sulcate; gills very broad, powdered with the echinulate globose spores ·00035 inch in diam.; stem striate, red-brown, dilated upwards.

Var. AMETHYSTEUS (no. 203 in part).

96. A. (CLITOCYBE) SUBLACCATUS, *B. & Br.* Pileo convexo laccato; stipite sursum attenuato farcto lamellisque adnatis planis concoloribus (no. 894, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus ½ inch across, convex, smooth, striate; stem 1 inch high, paler, dilated upwards, springing from a downy stratum which runs a little way up, stuffed; gills plane; spores subglobose, ·0002′ in diameter.

No. 894* is rather larger, with a stouter stem and even pileus.

97. A. (CLITOCYBE) PORPHYRODES, *B. & Br.* Pileo depresso squamuloso purpureo sulcato; stipite subæquali fusco; lamellis latis adnatis crassis distantibus interstitiis lævibus (no. 840).

On the ground. Peradeniya, Nov. 1868.

"Apparently very rare."

Pileus 1¼ inch across, depressed or umbilicate, dark purple, sulcate, clothed with minute fibrillose scales; stem 1¼ inch high, 2 lines thick, brown; gills broad, adnate; spores subglobose, nucleate, ·0002–·00025′ in diameter.

98. A. (CLITOCYBE) VINOSO-FUSCUS, *B. & Br.* Pileo convexo depresso sulcato fuligine consperso; stipite brevi glabro; lamellis latis adnato-decurrentibus distantibus crassis, interstitiis reticulatis (no. 96.)

On dead wood. Peradeniya, Nov. 1867.

Pileus 1 inch or more across; stem 1–1½ inch high, 2 lines thick; spores as in the last, to which it is closely allied.

99. A. (COLLYBIA) ENDOCHORDA, *B. & Br.* Pileo plano-depresso umbonato brunneo centro decolorante; stipite basi incrassato radicante sordide lilacino, medulla discreta; lamellis undulatis ventricosis adnato-decurrentibus (no. 703, cum icone).

On wood. Peradeniya, Aug. 1868.

Pileus 3 inches across, plane, depressed, broadly umbonate, brown, becoming paler in the centre, fleshy, flesh white; stem 6 inches or more high, ⅓ thick in the centre, thickened at the base, rooting, dull lilac, transversely spotted above, white at the apex, stuffed with a separable white substance; gills 5 lines broad, ventricose, undulated, adnate, decurrent; spores ·0008′ long.

Habit of *A. radicatus.*

100. A. (COLLYBIA) MULTIJUGUS, *B. & Br.* Cæspitosus, lentus; pileo e companulato depresso sulcato-rugoso tenui; stipite subæquali fistuloso; lamellis latis adnatis postice rotundatis, interstitiis reticulatis (no. 692, cum icone).

On dead wood. Peradeniya, Nov. 1868.

Cæspitose, sometimes forked; pileus 1¼–2½ inches across, at first campanulate, umbonate, vinous red, gradually becoming depressed or umbilicate, at length dirty white, strongly sulcate, and rugose; stem very variable in thickness, fistulose, smooth, much paler than the pileus or white; gills ⅓–½ an inch wide, waved, reddish or white; mycelium filamentous.

A very singular Agaric, apparently allied to *A. schizoxylon*, an undescribed species, of which we have a figure from the Swedish Museum.

101. A. (COLLYBIA) APALOSARCUS, *B. & Br.* Totus tener; pileo plano-convexo usque ad centrum striato; stipite brevi solido subæquali; lamellis ventricosis latis postice rotundato-adnexis margine crenatis (no. 699, cum icone).

On dead wood. Peradeniya, July, Aug., Nov. 1868.

"Very tender," dirty white; pileus 1½ inch across, striate from the margin to the obtuse centre; flesh moderately thick, cinereous; stem 1 inch high, 1½ line thick, solid, smooth, distinct from the flesh of the pileus, truncate at the base; gills ¼ inch broad, rounded behind, ventricose, nearly free, pallid; spores globose, ·0008′–·0006′ in diameter.

Undoubtedly allied to *A. magisterium*; but the drawing shows that it is a very different species. In some specimens the spores vary from ·0003′ to ·0009′ in diameter.

102. A. (COLLYBIA) MAGISTERIUM, *B. & Br.* Totus albidus; pileo late expanso carnoso molli obtusissimo margine crenato plicato; stipite apice basique dilatato discreto; lamellis latis serrulatis ventricosis crassis rotundato-adnatis (no. 768, cum icone).

On dead bark. Peradeniya, Sept. 1868.

"Soft and tender;" pileus 4–5 inches across, very obtuse, fleshy, margin crenate and striate; stem 1½ inch high, ⅓ inch thick in the centre, solid, fibrous within, quite distinct from the pileus, dilated above and below, truncate at the base; gills ½ inch broad, thick, ventricose, rounded behind, and broadly adnate serrulate; spores globose, ·0006–·0008′ in diameter. The pileus densely pulverulent from the spores, which look like a *magisterium*. When dry, ochraceous or fuliginous.

103. A. (COLLYBIA) EUPHYLLUS, *B. & Br.* Ochraceo-albidus; pileo convexo obtusissimo subcarnoso estriato leviter maculato pulverulento; stipite brevi e farcto cavo basi dilatato truncato; lamellis latissimis undulatis dente adnatis (no. 1201, cum icone) no. 731.

On dead wood. August 1865, July 1869.

Pileus 1½ inch across, hemispherical, plane above, pulverulent, minutely spotted; flesh distinct from the stem, the substance of which, however, spreads above the gills; stem ½ inch high, 1 line thick in the centre, at length hollow; gills ⅓ inch broad, undulated, ventricose, adnate, with a little tooth. Spores ·0006–·0008′ in diameter.

A miniature form of *A. magisterium*, with several distinctive characters.

104. A. (COLLYBIA) CHRYSOROPHUS, *B. & Br.* Pileo convexo tenui croceo lineato; stipite æquali pallidiore e farcto cavo; lamellis pallidis distantibus dente adnatis (no. 858, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus about 1 inch across, convex, with occasionally a minute central papilla, orange with darker streaks; flesh white, thin; stem nearly equal, 1 inch high, stuffed, then hollow, truncate at the base; gills few, distant, very pale straw-colour, adnate, with a small decurrent tooth.

Evidently allied to *A. velutipes*, but with a smooth stem.

105. A. (COLLYBIA) NEPHELODES, *B. & Br.* Pileo hemisphærico centro leviter depresso subfulvo nebuloso estriato; stipite recto glabro fistuloso; lamellis latis albidis truncatis leviter adnatis (no. 1172, cum icone).

On the ground. June 30, 1869.

Pileus 1½ inch across, hemispherical, slightly depressed in the centre, sienna-brown, paler towards the margin, fleshy; flesh sienna-brown beneath the cuticle; stem 3 inches high, ¼ thick, nearly white, fistulose; gills ⅓ inch broad, truncate behind, shortly adnate, pale straw-coloured.

Allied to *A. maculatus*. The pileus is curiously clouded. Spores oblong, ·0005′ by ·00025′.

106. A. (COLLYBIA) CUBISTES, *B. & Br.* Pileo plano umbonato pulverulento estriato subcarnoso; stipite obliquo æquali albo-farcto; lamellis angustis postice rotundatis adnexis stramineis (no. 1158, cum icone).

Probably on dead wood. July 1869.

Pileus 1½ inch across, plane, with the edge slightly turned up, obtusely and broadly umbonate, pulverulent, subcarnose, margin even, dirty white; stem 2 inches high, 2 lines thick, flexuous, slightly tinged without and within with rufous; gills crowded, 1 line broad, straw-coloured; mycelium rooting.

Allied to *A. magisterium* and *A. euphyllus*.

107. A. (COLLYBIA) DIMINUTUS, *B. & Br.* Pileo e subcampanulato expanso subcarnoso albido pulverulento; stipite brevi farcto; lamellis angustis adnatis (no. 1147, cum icone).

On dead wood. June 1869.

Dirty white; pileus $\frac{1}{3}$ inch across, at first campanulate, then expanded, pulverulent, margin even; stem $\frac{1}{4}$ inch high, $\frac{3}{4}$ line thick, stuffed; gills crowded, narrow, $\frac{1}{2}$ a line broad.

Allied to *A. cubistes*.

108. A. (Collybia) verticolor, *B. & Br.* Pusillus, albidus; pileo convexo subcarnoso estriato; stipite æquali solido e basi floccosa oriundo; lamellis adnatis (no. 834, cum icone).

On dead bark. Peradeniya, Nov. 1868.

Gregarious; pileus $\frac{1}{2}$ inch across, convex, slightly fleshy, dirty white; extreme margin fulvous, as is the whole plant when dry, pulverulent; stem $\frac{3}{4}$ inch high, 1 line thick, solid, springing from an orbicular floccose base; gills moderately broad, adnate or slightly adnato-decurrent.

Allied, though distantly, to *A. velutipes*. Apparently, as in that species, the cuticle is of a gelatinous consistence.

108 bis. A. (Collybia) clarus, *B. & Br.* Pileo convexo fulvo cuticula gelatinosa margine inflexo; stipite subæquali glabro; lamellis tenuibus ventricosis postice attenuatis flavis.

On dead wood. Peradeniya, Nov. 1867.

Pileus $1\frac{1}{2}$ inch across: stem $1\frac{1}{2}$ inch high.

Allied closely to *A. velutipes*.

No. 103, Gardner, is apparently the same species; but the specimens are in bad condition.

109. A. (Collybia) scotodes, *B. & Br.* Pileo convexo umbonato subcinereo subtiliter tomentoso; stipite deorsum attenuato cavo albo fibrilloso; lamellis ventricosis subliberis candidis (no. 205, cum icone).

On the ground. Peradeniya, Oct. 1868, Jan. 1869.

Pileus $1\frac{1}{2}$ inch across, convex, very obtusely umbonate, cinereous, paler towards the margin, not striate; stem 1 inch high, $\frac{1}{4}$ thick in the centre, at length hollow, the cavity extending nearly to the top of the umbo, fibrillose, white; gills 2 lines wide, white, ventricose, nearly free; spores ·000125′ long.

There is a form with the pileus chestnut-coloured (*A. contrarius*, B. & Br., MSS.), the stem of the same colour and rooting, and the gills ochraceous sinuated behind. Nov. 1867. Pileus 2 inches across; stem 2 inches high, $\frac{1}{4}$ thick.

110. A. (Collybia) sparsibarbis, *B. & Br. in Linn. Tr.* xxvii. p. 151. (No. 697, cum icone.)

On the ground. Peradeniya, July, August 1868.

Eaten by the Cingalese. Allied to *A. eurhizus*.

111. A. (Collybia) rufipictus, *B. & Cr.* Pileo e campanulato plano striato umbrino subvirgato; stipite solido radicante intus umbrino; lamellis angustis liberis (no. 707, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus nearly 2 inches across, at first campanulate, then plane, umber streaked with darker lines, margin striate; flesh white except beneath the cuticle; stem 2 inches high, 1½ line thick, solid, umber within; gills crowded, 1 line broad, arched, rounded behind, free, pale umber.

Without a sight of fresh specimens it may be doubtful whether this should not be referred to *Marasmius*.

112. A. (Collybia) dryophilus, *Bull.* (No. 702*, cum icone.)

Amongst dead vegetable remains. Peradeniya, Sep. 1868.

113. A. (Collybia) leucophæus, *B. & Br.* Tener, pileo plano depresso tenuissimo subrugoso fusco, stipite fistuloso stricto subconcolori glabro pilis brevibus circumdato; lamellis angustissimis arcuato-adnexis confertis (no. 204, cum icone).

On the ground.

Pileus 1 inch across, dark brown, plane, depressed, very thin, slightly rugose; stem 1¾ inch high, ¾ line thick, fistulose; gills very narrow, crowded, nearly white, arcuate, adnexed.

Allied to *A. ocellatus*. Contracts very much and loses its colour in drying.

114. A. (Collybia) omotrichus, *B. in Hook. Lond. Journ.* vol. iii. p. 410; *Gardn.* no. 10.

On the roots of plants. Peradeniya, May 1844. Uitenhage.

115. A. (Collybia) stupparius, *B. & C. Linn. S. I.* x. p. 285.

(No. 101 in part. Cuba, no. 75.)

On dead vegetables. Peradeniya, Nov. 1867.

116. A. (Mycena) myoderma, *B. & Br.* Pileo campanulato tenero subcinereo piloso; stipite concolori fibrilloso fistuloso; lamellis uncinatis adnatis pallido-carneis (855 *bis*, cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus ¾ inch across, cinereous, clothed with short hairs; stem 1½ inch high, fistulose, streaked; gills 1 line broad, ascending, uncinato-adnate.

Allied to *A. cohærens*.

117. A. (Mycena) melanatomus, *B. & Br.* Pileo campanulato-striato stipiteque solido particulis fuscis inspersis; lamellis antice latioribus, postice arcuato-adnexis (no. 855***, cum icone).

On the ground. Dec. 1868.

Pileus ½ an inch across, campanulate, grey, sprinkled with brown parti-

cles, as is the stem, $1\frac{1}{2}$ inch high, $\frac{1}{2}$ a line thick; gills cinerous, ventricose, arched behind, and adnexed.

118. A. (Mycena) ætitis, *Fr.* (No. 1194, cum icone.)
On dead wood. July 1869.

119. A. (Mycena) pallido-rubens, *B. & Br.* Rubidus: pileo campanulato membranaceo sulcato-striato, carne disci alba; stipite brevi truncato fistuloso; lamellis ventricosis postice sinuato-affixis (no. 1179).
On dead wood. July 1869.
Whole plant, with the exception of the flesh of the disk, dull reddish; pileus $\frac{1}{2}$ inch across, campanulate, sulcate; stem $\frac{1}{4}$ inch high, $\frac{3}{4}$ line thick, truly fistulose, truncate at the base, where it is slightly thickened; gills ventricose, shortly adnate, 1 line wide.

No. 937 is possibly the same species. Spores ·0003′ by ·00025′, echinulate.

120. A. (Mycena) Silenus, *B. & Br.* Pusillus, pileo campanulato striato rubro carnoso; stipite brevi fistuloso pallidiore; lamellis ventricosis breviter adnatis (no. 1162, cum icone).
On dead wood. July 1869.
Pileus $\frac{1}{4}$ inch across, campanulate, striate, dark vinous red, fleshy, with a minute papillæform umbo; flesh white; stem $\frac{1}{2}$ inch high, $\frac{3}{4}$ line thick, paler than the pileus, fistulose; gills ventricose, slightly adnate, deep red. Whole plant, when dry, with the exception of the flesh, deep red.

121. A. (Mycena) hæmaterus, *B. & Br.* Sanguineus; pileo campanulato umbone papillæformi; stipite curvo farcto; lamellis ventricosis dente adnexis (no. 854, cum icone).
On dead wood. Dec. 1868.
Cæspitose, dark blood-red; pileus scarcely $\frac{1}{2}$ inch across, campanulate, with a large nipple-shaped umbo, smooth, even; stem $\frac{3}{4}$ inch high, $\frac{1}{2}$ line thick, with a slender cavity; gills narrow, ventricose, attenuated behind, adnexed, sometimes slightly decurrent.

122. A. (Mycena) filopes, *Bull.* (No. 938.)
On the ground. Peradeniya, Jan. 1869.

123. A. (Mycena) acicula, *Schæff.* (No. 816 *bis*, cum icone.)
On rotten sticks. Nov. 1868, Jan. 1869.

124. A. (Mycena) citrinellus, *P.* (No. 929, cum icone.)
On dead wood. Peradeniya, Dec. 1868.

125. A. (Mycena) stylobates, *P.*
On dead wood. Peradeniya, Jan. 1869.

The specimens are darker than usual, but have exactly the same radiated disk.

126. A. (MYCENA) CLAVULIFER, *B. & Br.* Tenerrimus, albus; pileo hemisphærico setis clavuliformibus obsito; stipite e disco orbiculari oriundo; lamellis ventricosis (no. 803).

On decayed vegetable matter. Peradeniya, Nov. 1868.

Extremely delicate, white; pileus about a line across, convex, beset with clavate stiff hairs; stem ¼ inch high, filiform, springing from an orbicular radiately striate base; gills ventricose; spores ovate, ·0003′ long.

127. A. (MYCENA) TENERRIMUS, *B. Outl.* p. 129. (No. 861.)

On dead wood. Peradeniya, Dec. 1868.

Spores ·00025′ long.

127*. A. (MYCENA) CORTICOLA, *Schum.* (No. 1217, cum icone).

On bark. Aug. 1869.

A white variety with pale-brown flesh.

128. A. (MYCENA) HELISCUS, *B. & Br.* Pileo hemisphærico sulcato plumbeo stipiteque capillari albo pruinosis; lamellis paucis crassis adnatis (no. 944, cum icone).

On dead twigs. Jan. 1869.

Gregarious; pileus 1 line across, hemispherical, lead-coloured, deeply sulcate, pruinose; stem 1 inch high, white, thread-shaped, pruinose like the pileus; gills few, thick, white, adnate.

129. A. (MYCENA) PÆDISCULUS, *B. & Br.* Candidus, minimus, pileo subgloboso sulcato; stipite capillari, lamellis adnatis (no. 828).

On dead wood. Peradeniya, Oct. 1868.

Pileus ½ line across; stem 1 line high.

130. A. (MYCENA) PERONE, *B. & Br.* Pusillus, gregarius; pileo convexo umbonato pallido; stipite recto albo; lamellis ventricosis adnatis (no. 898, cum icone).

On the ground. Peradeniya, Jan. 1869.

Densely gregarious; pileus scarcely 2 lines across, convex, umbonate, dirty white; stem straight, ⅓ inch high, not ¼ line thick, white; gills ventricose, slightly adnate; spores ·00018′ long.

131. A. (OMPHALIA) HOLOCHLORUS, *B. & Br.* Pileo membranaceo e convexo subinfundibuliformi flocculoso striato luteo; stipite dilatato fistuloso; lamellis decurrentibus citrinis (no. 1146, cum icone).

On dead wood. June 1869.

Pileus 1 inch across, at first convex, umbilicate, then subinfundibuliform, membranaceous, flocculose, striate, brownish yellow; stem ¾ inch high, dilated above, fistulose, yellow, like the distant arched decurrent gills.

Certainly allied to *A. chrysophyllus*; but the pileus is a dark red-brown when dry, and the gills lemon-coloured rather than yelk-of-egg colour; the gills, moreover, are not so decurrent. Whole plant rufous when dry.

132. A. (Omphalia) viridi-carneus, *B. & Br.* Pileo tenui crenato sulcato carneo-virescente; stipite curvo cartilagineo fistuloso fulvo; lamellis albo-carneis adnato-decurrentibus distantibus (no. 862, cum icone).

On dead wood, Oct. 1865.

Pileus ¾–1 inch across, thin, umbilicate, crenate, sulcate, either entirely flesh-coloured or greenish with the margin pink; stem curved, tawny, or pallid; gills 1 line broad, waved, adnato-decurrent.

133. A. (Omphalia) lychnodes, *B. & Br.* Pileo umbilicato, dein cyathiformi cinereo sulcato; stipite porrecto glabro fistuloso candido; lamellis distantibus ventricosis adnato-decurrentibus (no. 1181 cum icone).

On dead wood. July 1869.

Pileus 1½ inch across, at first umbilicate, then cyathiform, ash-coloured, sulcato-striate; stem 1½ inch high, 1½ line thick, subhorizontal or ascending, smooth, white, fistulose; gills white, 1½ line broad, slightly ventricose, attenuated behind, distant, subdecurrent.

134. A. (Omphalia) cirrhocephalus, *B. & Br.* Pileo ex umbilicato depresso nitide gilvo; stipite undulato solido pallidiore; lamellis pallidis decurrentibus (no. 959, cum icone).

On dead wood. Peradeniya, Jan. 1869.

Pileus scarcely ¾ inch across, bright yellow-red, smooth; stem ¾ inch high, 1 line thick, undulated, smooth, paler than the pileus within and without; gills 1 line wide, pallid, decurrent, distant, interstices venose in front.

A very pretty little species, closely allied to the following.

135. A. (Omphalia) salmonicolor, *B. & Br.* Pileo depresso margine sulcato arcuato pallide salmonicolori glabro; stipite brevi insititio farcto glabro; lamellis angustis postice attenuatis breviter decurrentibus (no. 782*, cum icone).

On dead wood. Peradeniya, Jan. 1869.

Pileus 1 inch across, depressed, with the margin arched, sulcate, smooth, pale salmon-coloured; stem ½–¾ inch high, ¾–1 line thick, equal, attached by a little disk, truncate, paler than the pileus, smooth, stuffed; gills very narrow, of the same colour as the pileus, attenuated behind, slightly decurrent, distant, interstices venous towards the margin.

136. A. (Omphalia) umbelliferus, *L.*

Var. pileo nigro non hygrophano, stipite lamellisque candidis vel pallido-carneis (no. 951, cum icone). Jan. 1869.

A larger form is Gardn. no. 37 and (*monstrosus*) no. 35, stem confluent.

137. A. (OMPHALIA) ANTHIDEPAS, *B. & B.* Pileo depresso cyathiformique sulcato subtiliter fibrilloso; stipite sursum dilatato e farcto cavo; lamellis distantibus longe decurrentibus latis distantibus (no. 751, cum icone).

On dead wood. Peradeniya, Dec. 1868, Jan. 1869.

Pileus 1½–2 inches across, dirty white, sulcate, marked with livid fibrils; stems 2¼ inches high, 1 line thick in the centre, smooth; gills 2 lines broad, arcuate, distant, decurrent.

Allied to *A. lychnodes*, but differing in the fibrillose pileus, and the border not being so strongly involute. Spores ·00025′ long.

138. A. (OMPHALIA) PERI, *B. & Br.* Niveus; pileo membranaceo ex umbilicato infundibuliformi pulverulento estriato immutabili; stipite deorsum attenuato filiformi; lamellis confertis angustissimis adnato-decurrentibus (no. 1192, cum icone).

On the ground. July 1869.

Gregarious, snow-white; pileus ¾ inch across, membranaceous, pulverulent, even at first umbilicate, then infundibuliform, slightly undulated; stem ½ inch high, not ½ a line thick, solid; gills scarcely ½ a line broad, crowded, adnato-decurrent.

Closely allied to *A. scyphoides*; but the pileus does not change colour in drying, the gills are much narrower, the stems more slender, and it is a more graceful species. There is sometimes a little down at the base of the stem.

139. A. (OMPHALIA) MICROMELES, *B. & Br.* Pusillus; pileo subinfundibuliformi hyalino; stipite brevissimo; lamellis paucis angustis decurrentibus (no. 1177, cum icone).

On dead wood. July 1869.

White, with sometimes a tinge of yellow; pileus scarcely 2 lines across, much depressed, striate; stem 1 line high, with a narrow central tube; gills few, very narrow, decurrent.

Closely allied to *A. microscopicus*.

140. A. (OMPHALIA) DELICIA, *B. & Br.* Pileo campanulato umbilicato, umbonato, striato, tomentoso; stipite brevi gracili basi incrassato, e filis radiantibus oriundo sursum pulverulento; lamellis decurrentibus (no. 398).

On dead sticks. July 1869.

Pileus 2–3 lines across.

140*. A. (PLEUROTUS) DRYINUS, *P. Gard.* (No. 88, cum icone.)

On dead wood.

141. A. (Pleurotus) angustatus, *B. & Br.* Cæspitosus; pileo excentrico flabelliformi glabro cinereo; stipite elongato cylindrico albo, deorsum incrassato reticulato; lamellis albis decurrentibus (no. 202).

On dead wood. Nov. 1867.

Cæspitose; pileus 1½ inch across, excentric, subflabelliform, smooth, cinereous; stem 1½ inch high, ¼ thick, cylindrical, white, reticulate, often connate at the base; gills white, thin, decurrent; spores oblong, slightly curved, ·0003′ long.

142. A. (Pleurotus) rigescens, *B. & Br.* Pileo e suborbiculari flabellato lobato glabro rufo zonato, sicco rugoso; stipite distincto subæquali deorsum nigricante; lamellis angustissimis omnibus una decurrentibus (no. 695, cum icone; no. 97, 88, in part).

On dead wood. Peradeniya, Nov. 1867, July 1868.

Pileus at first suborbicular, then flabelliform and lobed, smooth, wrinkled and rigid when dry, rufous-zoned; stem short, distant, cylindrical, dark at the base; gills very narrow, all ending abruptly.

143. A. (Pleurotus) polychromus, *B. & Br.* Pileo suborbiculari excentrico glabro variicolori, carne alba; stipite brevi cylindrico albo farinaceo lamellisque angustis confertis postice attenuatis candidis (no. 960, cum icone).

On dead wood. Peradeniya, Jan. 1869.

Pileus ¾–1 inch across, excentric, sometimes quite lateral, convex, pale towards the margin, the disk, which is sometimes swollen, variously tinted with rufous and lilac; stem 1–2 lines high, white, farinaceous; gills white, very narrow and crowded, attenuated behind.

144. A. (Pleurotus) galeæformis, *B. & Br.* Pileo obliquo tenui striato galeæformi, postice rufo; stipite cylindrico, deorsum polito, fusco e basi orbiculari oriundo; lamellis latis, interstitiis venosis (no. 1207, cum icone).

On dead wood. Peradeniya, June 1869.

Pileus ¾ inch across, and as much high, helmet-shaped, thin, striate, pale in front, rufous behind; stem 2 lines high, cylindrical, polished, not a line thick; gills pale ochraceous, rather broad, interstices venous.

145. A. (Pleurotus) flabellatus, *B. & Br.* Pileo flabelliformi tenui candido vel rubescente tomentoso glabrescente postice attenuato; stipite brevissimo tomentoso; lamellis angustis decurrentibus (no. 88, no. 92 in part).

On dead wood. Peradeniya, Aug., Nov. 1867, Aug. 1868.

Pileus 1–1½ inch across, flabelliform, white, sometimes tinged slightly with red, attenuated behind, and ending in a very short tomentose stem; gills white, narrow, decurrent; spores oblong, with a little point at the base, ·0004′ long.

Adhering to the wood by a spongy base. It occurs also in Venezuela.

146. A. (Pleurotus) scytocephalus, *B. & Br.* Candidus; pileo orbiculari galeæformi glabro, margine involuto; stipite brevi deorsum attenuato glabro; lamellis angustis decurrentibus (no. 20).

On dead wood. Nov. 1867.

Pileus ½–¾ inch across, suborbicular, cuculliform, smooth; margin involute; stem about 1 line high and thick, smooth, distinct, incrassated upwards; gills narrow, decurrent; spores oblong, ·00025′ long.

Distinguished at once from the last by the smaller spores.

147. A. (Pleurotus) leptogramme, *B. & Br.* Pileo flabelliformi tomentoso lineis tenuibus versus marginem notato; stipite obsoleto; lamellis ventricosis candidis.

On dead wood. Nov. 1867.

Pileus 3 inches across, flabelliform, attenuated behind, tomentose, marked with little close-pressed fibrils in front; stem very short, almost obsolete, white, tomentose; gills ventricose, attenuated behind, white; spores ·0002′–·0003′ long.

Allied to *A. serotinus.* Margin involute.

148. A. (Pleurotus) versiformis, *B. in Hook. Lond. Journ.* vi. p. 484.

In forests, on mossy branches. Talagalla, Feb. 1846 (*Gardner*).

149. A. (Pleurotus) testudo, *B. l. c.* p. 485; *Gard.* no. 41.—A. barbatus, *B. & C.* (no. 88) in part.

On dead wood. Hautane. June 1844, *Gardner.* Peradeniya. Cuba, no. 44.

150. A. (Pleurotus) subbarbatus, *B. & C. in Linn. S. J.* x. p. 288. Cuba, no. 808 (no. 89).

On dead wood. Peradeniya, Aug., Dec.

No. 391 is a tender variety, which comes very close to *A. striatulus.* This at length collapses and clings close to the matrix as in a state of *A. applicatus*, forwarded by Prof. Fries.

151. A. (Pleurotus) semisupinus, *B. & Br.* Pileo primum Pezizæformi villoso demum semisupino; lamellis ventricosis circa discum tomentosum sitis (no. 181).

On dead twigs and leaves. Peradeniya, Sept., Dec.

Pileus 2 lines across, at first appearing under the form of a snow-white pezizæform body, which gradually opens and exposes the gills, which are arranged round a central villous disk, at length half reflexed. The gills in age acquire a reddish tinge. Spores subglobose, ·0004′–·0005′ long.

152. A. (VOLVARIA) TERASTIUS, *B. & Br. in Linn. Tr.* xxvii. p. 151, tab. 34. (No. 689*, cum icone.)

On the ground. Peradeniya, July–Nov. 1868.

Specimens with perfect spores have lately been received, which show that it is not an *Amanita* as originally supposed. Spores ·00025′–·0002′ long.

153. A. (VOLVARIA) GEASTER, *B. & Br.* Pileo campanulato sericeo-striato fusco; volva lævi lobata intus candida extus umbrina lobis reflexis (no. 822, cum icone).

On the ground. Peradeniya, Nov. 1868.

The only specimen is unfortunately in a young state, and the gills immature. It so closely resembles a *Geaster* that Mr. Thwaites thought that it was one till he divided it. Margin pale, closely striate.

154. A. (VOLVARIA) VOLVACEUS, *Bull.* (No. 790.)

On the ground. Peradeniya, Nov. 1868.

There is a pale variety with very broad gills.

155. A. (VOLVARIA) PSEUDO-VOLVACEUS, *B. & Br.* Pileo conico-convexo fibrilloso; stipite sursum incrassato e volva bifida fuliginosa oriundo; lamellis ventricosis liberis; sporis minoribus (no. 709, 777, 790 in part).

On the ground. Peradeniya, Nov.–Dec. 1868, Jan. 1869.

Differs from the last in the smaller size of the spores, which are ·00015′–·0002′ long.

156. A. (VOLVARIA) DIPLASIUS, *B. & Br. in Linn. Tr.* xxvii. p. 151, tab. 33 *c.* (No. 689, cum icone.)

On the ground, springing from rotten wood. Peradeniya, July 1868.

Spores ·00028′–·0003′ long.

157. A. (VOLVARIA) APALOTRICHUS, *B. & Br.* Pileo convexo subcarnoso subtiliter piloso virgatove cinereo, carne alba; stipite gracili e volva parva libera oriundo solido; lamellis ventricosis (no. 709, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 1–1¼ inch across, delicately pilose or virgate subcarnose; flesh white; stem 2 inches high, 1 line thick in the middle, smooth, solid, springing from a small bilobed free volva; gills slightly ventricose; spores ·0002′ long.

158. A. (VOLVARIA) COLEATUS, *B. & Br.* Pileo convexo subcarnoso, subtiliter piloso, cinereo; stipite subæquali e volva vaginata oriundo solido; lamellis angustis (no. 709*, cum icone).

On the ground. Peradeniya, July, Aug. 1868.

Pileus 1½ inch across, convex, obtuse, clothed with delicate hairs, cinereous: stem 1½ inch high, 1½ line thick, rather contracted in the centre, undulated, with corresponding darker portions within, springing from a close sheath-like volva; gills about a line broad, not ventricose, free; spores ·00025′ long.

Closely alled to the last, but differing in several important particulars.

159. A. (VOLVARIA) MICROCŒLIUS, *B. & Br.* Pileo e campanulato plano fibrillis sparsis obsito; stipite gracili; lamellis angustis ventricosis; sporis globosis (with no. 709).

On the ground. Peradeniya, Nov. 1868.

Pileus ½ inch across, livid, clothed with scattered hairs; stem 1 inch high, ½ line thick; volva dark; gills narrow; spores globose, ·00025′ in diameter.

160. A. (VOLVARIA) GLANDIFORMIS, *B. & Br.* Pileo ovato obtuso estriato glabro; stipite sursum attenuato e volva cupulæformi multipartita intus pubescente oriundo; lamellis tarde carneis (no. 946, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus ⅓ inch across, snow-white, smooth, ovate obtuse; flesh white; stem ½ inch high, ½ line thick, white, springing from a multifid cup-shaped volva, which is tomentose within; gills very pale flesh-colour; spores ovate, ·00025′ long.

161. A. (PLUTEUS) CERVINUS, *Schæff.*; *Gardn.* (nos. 22–98); *Thwaites* (no. 760***, cum icone).

On dead wood and on the ground. Hautane (*Gardner*), Sept. 1844. Peradeniya, Sept. 1868.

Spores subglobose, ·00025′ long.

162. A. (PLUTEUS) SUBCERVINUS, *B. & Br.* Pileo convexo fibrilloso-picto cervino; stipite subæquali albo fibrilloso solido; lamellis ventricosis postice rotundatis; sporis ovatis (no. 917).

On dead wood. Peradeniya, Jan. 1869.

Pileus livid-brown, 1½ inch across; stem 1 inch high, about a line thick; spores ovate, ·0002 long.

Smaller than the last, and with different spores.

163. A. (PLUTEUS) ÆOLUS, *B. & Br.* Pileo convexo areolato particulis nigris obsito; stipite basi dilatato; lamellis falciformibus (no. 925).

On dead wood. Peradeniya, Dec. 1868.

Pileus 2 inches across, convex, covered with sooty particles, which are so disposed as to leave paler spots; stem 3 inches high, 2 lines thick, solid, dilated at the base; gills falciform; spores globose. ·00025 in diameter.

Allied to *A. cervinus.*

164. A. (Pluteus) psichiophorus, *B. & Br.* Pileo e campanulato plano fortiter umbonato lurido miculato; stipite tenui basi incrassato; lamellis latis (no. 915).

On dead wood. Peradeniya, Jan. 1869.

Pileus 1 inch across, at first campanulate, then convex, expanded or slightly depressed, strongly umbonate, brown, clothed with scattered little scales or patches; stem 1 inch or more high, thickened at the base; gills broad, ventricose; spores globose, ·00025′ in diameter.

165. A. (Pluteus) spilopus, *B. & Br.* Pileo convexo, carnoso, obtusissimo, atro-fusco, floccoso-virgato, carne medio crassa candida; stipite basi incrassato particulis nigris insperso solido; lamellis ventricosis latis postice attenuatis remotis carneis (no. 1167, cum icone).

On sandy soil. July 1869.

Pileus 2 inches across, convex, very obtuse, dark brown with paler streaks; flesh white, thick in the centre; stem 1¾ inch high, ⅓ thick in the centre, solid, white within, sprinkled with black specks, thicker below; gills 3 lines or more broad, ventricose in front, attenuated behind, and having a broad space round the top of the stem; spores subglobose, with a large nucleus, ·0003′ in diameter.

Remarkable amongst its allies for the gills being strongly attenuated behind.

166. A. (Pluteus) albo-lineatus, *B. & Br.* Pileo campanulato umbonato atro-cinereo albo-lineato; stipite flexuoso sursum attenuato solido in umbonem immerso; lamellis undulatis ventricosis postice rotundatis liberis remotis (no. 757, cum icone).

On dead wood.

Pileus 1½ inch across, umbonate, livid-brown variegated with white lines; flesh brown under the cuticle; stem flexuous, 2 inches high, 2 lines thick in the centre, attenuated from the base upwards, sunk into the umbo; gills pale pink, undulated, slightly ventricose, rounded behind, remote, nearly 2 lines broad; spores subglobose, ·00025′ long.

167. A. (Pluteus) nanus, *P.* (No. 760**.)

On dead wood.

Spores globose, ·00025′ in diameter.

168. A. (Pluteus) glyphidatus, *B. & Br.* Pileo e campanulato plano l. depresso pallido particulis parvis pulverulento, margine striato; stipite citrino solido; lamellis remotis liberis crenulatis (no. 707, cum icone).

On dead wood. Peradeniya, Aug.–Dec. 1868.

Pileus 1½ inch across, campanulate, obtuse, or with an obtuse umbo, then plane or depressed, lemon-coloured, or tinged with cinereous, thin; flesh white, dark beneath the cuticle; stem 1½ inch high, 2 lines thick, generally attenuated upwards, solid, lemon-coloured, sometimes slightly twisted; gills segmentiform, rounded behind, remote, at first white, slightly tinged with yellow, then rose-coloured; spores globose, ·00025′ in diameter.

Undoubtedly nearly allied to the last; but, as appears from the numerous drawings, the campanulate pileus and crenate gills are distinctive.

No. 860 is a variety, "dull, transparent, white or pale gilvous." Pileus ¾ inch across.

169. A. (Pluteus) STIGMATOPHORUS, *B. & Br.* Pileo convexo umbonato demum depresso fuliginoso stipiteque basi incrassato pallido particulis concoloribus obsitis; lamellis ventricosis (no. 918, cum icone).

On dead wood. Peradeniya, Jan. 1869.

Pileus 2 inches across, convex, then depressed, fuliginous, clothed with minute sooty particles; stem 1½–2 inches high, dilated at the base, truncate, clothed like the pileus with dingy scattered particles; gills broad, ventricose; spores globose, ·00025′ in diameter.

170. A. (Pluteus) ESCHARITES, *B. & Br.* Pileo convexo umbilicato squamulis minutissimis obsito, margine striato; stipite sursum incrassato griseo-glauco basi truncato; lamellis fuligineis falciformibus posticę attenuatis (no. 868, cum icone).

On dead wood. Jan. 1869.

Pileus ¾ inch across, convex, umbilicate, brown, covered with minute dot-like scales; margin striate; stem 1½ inch high, dilated upwards, curved and truncate at the base, fibrillose, stuffed; gills falciform; spores globose, ·00022′ in diameter.

171. A. (Pluteus) BRUNNEO-PICTUS, *B. & Br.* Pileo convexo fortiter umbonato lineis fibrillosis picto brunneo; stipite candido; lamellis ventricosis postice rotundatis (no. 916, cum icone).

On dead wood, Peradeniya, Dec.–Jan.

Pileus ¾ inch across, convex, with a strongly developed papillæform umbo streaked with brown fibrillæ; stem nearly equal, white, stuffed; gills pale, ventricose, rounded behind; spores ovate, ·00025′ long.

Differs from *A. psichiophorus* in the marking of the pileus, and in the ovate not globose spores.

172. A. (Pluteus) CONIZATUS, *B. & Br.* Pileo plano tenui umbonato in particulas pulveraceas hic illic fracto, margine striato; stipite sursum attenuato; lamellis ventricosis postice rotundatis remotis; sporis globosis (no. 757**, cum icone).

On dead wood. Peradeniya, Oct., Nov. 1868.

Pileus 3 inches across, plane, umbonate, pale gilvous, striate, the surface broken up into minute powdery patches, at length leaving the substratum exposed in parts; stem 3 inches high, ⅔ thick in the centre, attenuated from the base upwards, lemon-coloured, solid; gills ⅓ inch broad, ventricose, rounded behind, free, remote; spores globose, ·00028′ in diameter. "Tough and elastic."

173. A. (PLUTEUS) MARMORATUS, *B. & Br.* Pileo convexo fortiter umbonato marmorato; stipite recto truncato torto striato solido; lamellis segmentiformibus postice rotundatis approximatis (no. 754*, cum icone).

On rotten wood. Dec. 1868.

Pileus 1¾ inch across, pale gilvous, marbled with darker lines; stem 1½ inch high, ¼ thick, truncate at the base, twisted, striate, the striæ following the twisting of the stem; gills nearly ¼ inch across.

174. A. (PLUTEUS) PULVINUS, *B. & Br.* Pileo convexo fortiter umbonato striato particulis pulveraceis consperso; stipite subæquali solido; lamellis latis ventricosis approximatis (no. 757***, cum icone).

On dead wood. Peradeniya, Nov. 1868.

Spores ·00025′ long.

The cuticle does not chip off as in *A. conizatus*; gills nearly ¼ inch broad.

175. A. (PLUTEUS) AGLÆOTHELES, *B. & Br.* Mollis, tener; pileo convexo expanso obtuso albido glabro; margine tenui estriato; stipite horizontali subæquali albo solido; lamellis rotundato-liberis (no. 1189, cum icone).

On dead wood. July 1869.

Subcæspitose, soft, tender; pileus 3 inches or more across, convex, expanded, very obtuse, smooth, dirty white, slightly wrinkled at the apex; flesh thick in the centre, white; stem horizontal, 3 inches long, ¼ thick, smooth, white, solid, nearly equal, a little thicker at the base; gills 4 lines broad, ventricose, rounded behind, free; spores ·00025′ long, cystidia urn-shaped.

Allied to *A. roseo-albus.*

176. A. (PLUTEUS) FUSCO-NIGRICANS, *B. & Br.* Pileo tenui convexo fortiter umbonato atomato-pruinato striato; stipite obliquo albido fistuloso; lamellis latis ventricosis postice rotundatis liberis (no. 1150, cum icone).

On dead wood. June 1869.

Pileus 1 inch across, dark brown, convex, strongly umbonate, striate, clothed with powdery particles; stem 1 inch high, scarcely 1 line thick, dirty white, fistulose; gills 2 lines broad, ventricose, rounded behind, free; spores ovate, ·00025′ long.

Differs from *A. nanus* in the umbonate pileus, fistulose stem, and ovate spores.

177. A. (PLUTEUS) GRANDINEUS, *B. & Br.* Pileo e convexo depresso verruculis minutis pulveraceis obsito; stipite subæquali; lamellis latis ventricosis liberis (no. 919).

On dead wood. Peradeniya, Dec. 1868.

Pileus 1 inch across, fawn-coloured, convex, then depressed, beset with minute pulverulent granules; stem $1\frac{1}{2}$ inch high, downy at the base; gills 2 lines or more broad; spores ovate, $\cdot 000\dot{3}'$ long.

178. A. (PLUTEUS) PHLEBOPHORUS, *Dittm. Gardner*, no. 46.

On dead wood. Hautane, 1844.

179. A. (PLUTEUS) EUGRAPTUS, *B. & Br.* Pileo plano leviter umbonato umbrino lineis obscurioribus radiato; stipite curvo sursum pallido basi umbrino farcto; lamellis leviter ventricosis umbrinocarneis (no. 1148, cum icone).

On dead wood. June 1869.

Pileus $\frac{3}{4}$ inch across, plane, slightly umbonate, membranaceous, smooth, umber marked with radiating darker striæ; stem $\frac{3}{4}$ inch high, not a line thick, pale above, umber below, stuffed; gills pinkish, slightly ventricose, about a line wide in the middle; spores subglobose or broadly elliptic, $\cdot 00025'$ long.

Allied to *A. umbrinellus.*

180. A. (PLUTEUS) PELINUS, *B. & Br.* Pileo convexo argillaceo, carne alba; stipite subæquali concolore; lamellis latis ventricosis carneo-subconcoloribus (no. 920, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus 1 inch across, convex, dirty yellow-brown, mottled, obscurely pulverulent; stem 1 inch high, 1 line thick, of the same colour within and without, stuffed, nearly equal; gills nearly 2 lines broad, tinged with pink; spores ovate, $\cdot 000\dot{3}'$ long.

181. A. (PLUTEUS) BALANATUS, *B. & Br.* Pileo glandiformi glabro; stipite striato sursum attenuato farcto; lamellis ventricosis liberis (no. 943, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus acorn-shaped, $\frac{1}{3}$ inch across in the middle, smooth, white, mottled with pink specks; stem 1 inch high, 1 line thick, white, stuffed; gills 1 line broad, pale-pink; flesh white, except just above the gills, where it is red.

181*. A. (ENTOLOMA) ARDOSIACUS, *Bull.*

Var. AGAUUS, *B. & Br.* Pileo pulveraceo amethystino, margine sulcato; stipite cæruleo (no. 799, cum icone).

On the ground. Peradeniya, Nov. 1868.

A very beautiful Agaric, approaching very near to a form of *A. ardosiacus*, of which we have a drawing from the Swedish Museum, which Fries supposes may possibly be distinct.

182. A. (ENTOLOMA) CHRYSÆGIS, *B. & Br.* Pileo convexo demum centro depresso tenui aureo striato; stipite basi dilatato striato solido; lamellis postice truncato-sinuatis adnexis (no. 811, cum icone).

On decaying wood. Peradeniya, Nov. 1868. Rare.

Pileus 2 inches across, of a brilliant golden-yellow, slightly wrinkled at the depressed apex, striate; flesh thin, white; stem 2–2½ inches high, about two lines thick in the centre, thickened at the base, striate, solid, white; gills arched, not ventricose, ¼ inch broad, pale-pink, truncate and sinuated behind, almost free; spores subglobose, with a large nucleus, ·00025 in diameter.

In many points resembling *A. leoninus*, but is not campanulate, nor are the gills ventricose or rounded behind; they approach rather to the type of *Entoloma*, to which it is accordingly referred.

183. A. (ENTOLOMA) GRISEO-CYANEUS, *Fr.*

Var. coloribus saturatioribus (no. 799, cum icone).

On the ground. Jan. 1869.

Pileus and stem blue; flesh and interior of fistulose stem pale blue.

184. A. (ENTOLOMA) RETROFLEXUS, *B. & Br.* Pileo convexo umbilicato alutaceo glabro; stipite gracili subtiliter fistuloso concolori; lamellis crassiusculis ventricosis postice rotundato-sinuatis adnexis, antice excedentibus (no. 948, cum icone).

On wood. Peradeniya, Dec. 1868.

Pileus not ½ an inch across, convex, umbilicate, clay-coloured, darker in the centre, smooth; stem 1¾ inch high, ⅓ line thick, paler; gills ventricose, sinuated behind, adnexed, buff, extending beyond the margin, so as to give the pileus the appearance of having its margin turned back; spores angular.

185. A. (ENTOLOMA) RHODOPOLIUS, *Fr.* (No. 760, cum icone.)

On the ground. Peradeniya, Sept. 1868.

Spores ·0005′ long.

186. A. (ENTOLOMA) IODNEPHES, *B. & Br.* Pileo e campanulato subacuto cyathiformi violaceo pulverulento; stipite compresso concolori cavo; lamellis falciformibus carneis (no. 749, cum icone).

On the ground. Peradeniya, Sept. 1868.

Pileus ⅓–⅔ inch across, campanulate, rather acute, then cup-shaped, bright violet, pulverulent; stem 1–1½ inch high, slender or rather stout, in the latter case compressed, hollow, paler than the pileus, rather rooting; gills falciform, adnexed; mycelium white, fibrous; spores angular, ·0003′–·0004′ by ·0002′–0003′.

187. A. (ENTOLOMA) SERICEUS, *Bull.*
Var. stipite fibrilloso-farcto (no. 869, cum icone).
On the ground. Peradeniya, Dec. 1868.

188. A. (ENTOLOMA) MAZOPHORUS, *B. & Br.* Pileo convexo eximie umbonato subcarnoso glabro; stipite subæquali e farcto cavo; lamellis arcuatis adnexis (no. 1185, cum icone).
On the ground. June 1869.
Pileus nearly an inch across, convex, slightly fleshy, with a well-developed obtuse umbo, smooth, pallid; flesh with a slight pinkish tint; stem 1 inch high, 1½ line thick, smooth, stuffed, then hollow; gills rather more than a line broad, arched, rounded behind, and slightly adnexed, pink; spores angular, ·00025′ across.
Allied to *A. elodes*.

189. A. (ENTOLOMA) MICROCARPUS, *B. & Br.* Cæspitosus, edulis, albidus; pileo convexo fisso acutissime umbonato; stipite farcto glabro; lamellis arcuatis pallide carneis liberis (no. 748, cum icone; *Gardn.* no. 71, cum icone).
In large patches, on the flower-borders and on grass. Peradeniya, Sept. 1868.
Eaten by the natives.
Cæspitose; pileus ½–1 inch across, dirty-white, darker towards the prominent umbo, soon split at the margin, even; stem 1½–2 inches high, ⅔–1 thick, somewhat rooting, nearly equal, smooth, stuffed, at length partially hollow; gills about a line broad, rounded behind, free, or nearly so; spores obliquely oblong, ·0002′–·00025′ long; mycelium forming little granular masses.

190. A. (ENTOLOMA) INTERMIXTUS, *B. & Br.* Pileo e convexo umbonato plano fibroso-striato; stipite elongato æquali radicante; lamellis adnexis (no. 784 in parte).
On the ground. Peradeniya, Jan. 1869.
Pileus 1 inch across, convex, sharply umbonate, streaked with dark fibres; stem 1½–3 inches high, 1 line thick, more or less rooting; gills slightly ventricose, adnexed; spores ·0003′–·0005′ long, often adhering to each other.

191. A. (ENTOLOMA) STYLOPHORUS, *B. & Br.* Pileo conico sericeo-nitente, umbone elongato; stipite farcto subæquali; lamellis angustis ventricosis (no. 748*, cum icone).
On the ground. Peradeniya, Sept. 1868.
Pileus ¾ inch across, conical, white tinged with pink, shining, umbo

elongated cylindrical acute or truncate; stem 1 inch high, equal, stuffed; gills not a line wide; spores angular.

Differs obviously from *A. microcarpus* in the angular spores.

192. A. (ENTOLOMA) PALLIDO-GILVUS, *B. & Br.* Pileo convexo umbonato; stipite brevi æquali e farcto cavo; lamellis planis postice sinuatis (no. 863).

On the ground. Peradeniya, Dec. 1868.

Pileus ¾ inch across, convex, umbonate, smooth; stem ¾ inch high, 1 line thick; gills plane, arcuate, sinuated behind, 1 line broad; spores angular.

The whole plant becomes umber in drying.

193. A. (ENTOLOMA) ARGILOPHYLLUS, *B. & Br.* Pileo convexo cinereo pruinoso; stipite curvo particulis fuscis insperso; lamellis tenuibus latissimis (no. 873).

Pileus 1 inch high, dark grey, pulverulent; stem 1 inch high, 1 line thick, curved, beset with little dark particles; gills 2 lines wide, thin, pallid, argillaceous; cystidia large.

There may possibly be some doubt as to the proper position of this species, as we have not seen the spores.

194. A. (CLITOPILUS) TEPHRAS, *B. & Br.* Pileo e convexo plano subdepresso cinereo-glauco tenui pulverulento l. virgato; stipite sursum incrassato subconcolori cavo; lamellis arcuatis leviter decurrentibus carneis (no. 747*, cum icone).

Amongst decayed vegetable matter. Peradeniya, Dec. 1868.

Pileus ¼ inch across, convex, then plane or depressed, bluish ash-colour, pulverulent, or minutely virgate; stem ¾ inch high, dilated upwards, ½ line thick in the centre, hollow, nearly of the same colour as the pileus; gills narrow, flesh-coloured, decurrent; spores dingy, ·0002′ inch long.

195. A. (CLITOPILUS) SUBGILVUS, *B. & Br.* Pileo plano-depresso subzonato membranaceo pallide gilvo estriato; stipite sursum dilatato pallido fistuloso radicante; lamellis adnato-decurrentibus pileo concoloribus (no. 1184, cum icone).

On the ground. June 1869.

Pileus about 1 inch across, plane, depressed, slightly zoned, pale reddish, membranaceous; stem 1 inch high, 1 line thick in the centre, dilated upwards, truly fistulose, much paler; gills 1 line broad, adnato-decurrent, of the same colour as the pileus.

Allied to *A. cancrinus.* Stem rooting, with a thread-like mycelium.

196. A. (LEPTONIA) GNAPHALODES, *B. & Br.* Pileo tenui umbilicato; margine arcuato substriato flocculento; stipite sursum attenuato

pallido; lamellis latis dente adnatis secedentibus (no. 921, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus 1 inch across, umbilicate; border arched, faintly striate, pinkish-grey; stem ¾ inch high, minutely hollow, white within, externally pallid; gills 2 lines wide, adnate, with a small tooth at length seceding; spores angular.

197. A. (LEPTONIA) GNOPHODES, *B. & Br.* Pileo convexo profunde umbilicato caliginoso; stipite sursum dilatato solido, intus extusque brunneolo; lamellis latis adnatis (no. 841, cum icone).

On the ground. Peradeniya, Nov.–Dec. 1868.

Pileus ¾ inch across, convex, deeply and acutely umbilicate, dingy; stem 1½ inch high, slender, dilated upwards, brown without and within, except at the apex; gills 2 lines broad, arched, horizontal, adnate, edge entire.

Mixed with *A. serrulatus.*

198. A. (LEPTONIA) SERRULATUS, *P.* (No. 841*, cum icone.)

On the ground. Peradeniya, Nov.–Dec. 1868.

No. 841**, cum icone, is a variety with a solid stem.

199. A. (LEPTONIA) INCANUS, *Fr.*, var. POLYCHROUS.

Pileo nitide æruginoso, lamellis e lilacino virescentibus (no. 801, cum icone).

On the ground. Peradeniya, Nov. 1868.

Spores ·00025′–·0004′ long.

200. A. (NOLANEA) FULVO-LANATUS, *B. & Br.* Pileo tenui convexo pilis fulvis strigoso; stipite tubuloso deorsum fulvo-lanato; lamellis carneis subliberis (no. 855, cum icone).

On the ground. Dec. 1865.

Pileus ½ inch across, convex, obtuse, yellowish or tawny, thin, clothed with fascicles of tawny hairs; stem 1¼ inch high, ¾ line thick, smooth above, clothed with tawny down below, equal or attenuated downwards, tubular; gills ventricose, about a line wide, nearly free.

Undoubtedly allied to *A. Babingtonii*, Blox. The stem is clothed as in *A. campanulatus.*

201. A. (NOLANEA) LASIUS, *B. & Br.* Pileo e campanulato umbilicato griseo squamulis pilosis obsito; stipite sursum dilatato concolori hispidulo e farcto eximie fistuloso; lamellis sinuato-affixis denticulatis (no. 855*, cum icone).

On the ground. Jan. 1869.

Pileus ½ inch across, at first campanulate, then convex, umbilicate, grey, clothed with little erect pilose scales; stem ¾ inch high, ¾ line thick, dilated upwards, beset with little hispid specks, downy at the base, stuffed, then fistulose; gills rather broad, pink, serrated, sinuated behind; spores ·0005′ long.

202. A. (Nolanea) elaphines, *B. & Br.* Pileo campanulato cervino breviter lanato; stipite gracili concolori glabro; lamellis ventricosis postice attenuatis sinuatis breviter affixis e cervino carneis (no. 941).

On the ground. Peradeniya, Dec. 1868.

Pileus ⅓ inch across, campanulate, pale fawn-coloured, clothed with short down; gills ventricose, fawn-coloured, sinuated and attenuated behind, distant, at length sprinkled with the rosy angular spores.

203. A. (Eccilia) hyalodepas, *B. & Br.* Pileo ex umbilicato cyathiformi pallido striato; stipite flexuoso e farcto subtiliter fistuloso, lamellis ex albo carneis decurrentibus (no. 871, cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus 1 inch across, deeply cup-shaped, striated; margin waved, striate, white, shaded with pink; stem 1 inch high, stuffed, running through the flesh of the pileus to the bottom of the cavity, with a slender channel in the centre; gills white, thin, narrow, slightly ventricose, decurrent, pink; spores angular or subglobose, ·0004′–·0005′ in diameter.

204. A. (Pholiota) micromeres, *B. & Br. in Linn. Tr.* vol. xxvii. p. 152 (no. 690, cum icone).

On dead wood. Peradeniya, July 1868.

205. A. (Hebeloma) micropyramis, *B. & Br.* Pileo campanulato umbone prominente papillæformi, verrucis pulvereque ferrugineis obsito; stipite gracili flexuoso; lamellis latiusculis postice rotundatis adnexis olivaceo-fuscis acie albidis.

On the ground. Peradeniya, Nov. 1869. Sent without any number.

Pileus 1 inch across, stem 2 inches high; spores ovate, ·00025′ long.

Allied to Fries's first section of *Hebeloma*.

206. A. (Flammula) rufipunctatus, *B. & Br.* Pileo depresso tenui punctato estriato; stipite subæquali liturato solido, lamellis ventricosis e pallido ferrugineis decurrentibus (nn. 207, 704, cum icone).

On dead wood. Peradeniya, July–Aug. 1868.

Pileus 1½–2 inches across, soon depressed, pale rufous, with darker dots; stem 1½ inch high, 1½ line thick, pale, with short rufous streaks, nearly equal, solid; mycelium white, thread-like; gills 1½ line broad, ventricose, decurrent, ferruginous; spores ·00025′ long.

There is a form less distinctly dotted. Sometimes the stem is dilated above. Allied, but not very closely, to *A. fusus*.

207. A. (Flammula) Janus, *B. & Br.* Cæspitosus, sulfureus; pileo convexo obtuso umbonatove subcarnoso; stipite subæquali fistuloso glabro; lamellis angustis e subfusco ferrugineis (no. 759, cum icone).

On dead wood. Dec. 1868.

Cæspitose, sulphur-coloured; pileus ¾–1 inch across, convex, obtuse, or umbonate, slightly fleshy, flesh lemon-coloured; stem about an inch high, 1 line thick, curved, smooth, fistulose; gills very narrow, arched, slightly adnate; spores ·00025′–·0003′ long by ·00015′–·0002′.

Allied to *A. conissans.*

208. A. (Flammula) goniosporus, *B. & Br.* Albidus; pileo convexo subcarnoso obtuso; stipite flexuoso cavo e basi suborbiculari tomentoso oriundo; lamellis subventricosis late adnatis; sporis angulatis (no. 835, cum icone).

On dead wood. Peradeniya, Nov. 1868.

Gregarious; pileus scarcely ¾ inch across, dirty white, with occasionally a darker zone which remains in drying, slightly fleshy, flesh white; stem 1 inch high, flexuous, hollow, springing from a white suborbicular base; gills 1 line broad, slightly ventricose, broadly adnate; spores ·0002 across, angular.

The spores are nearly square or spade-shaped, and different from any thing we have seen in this subgenus.

209. A. (Flammula) alutiphyllus, *B. & Br.* Pileo convexo aurantiaco subtiliter tomentoso postice fuliginoso, stipite compresso pallido; lamellis adnexis nitide alutaceis margine albo no. 405).

On dead wood.

There are unfortunately no spores in the specimens. It appears to be a very beautiful species. The black matter looks, at first sight, like some mould; but the microscope shows it to be a part of the pileus.

210. A. (Flammula) sapineus, *Fr.* (No. 401, cum icone.)

On dead wood, evidently of some Conifer. Possibly from imported deal. Peradeniya, Sep.–Nov. 1868.

Far paler in colour than European specimens. Spores ·00025′–·0003′ long.

211. A. (Flammula) holocrocinus, *B. in Lond. Journ.* vol. vi. p. 485.

On dead wood. Ambegamoa, Feb. 1846.

Gills narrow.

212. A. (Flammula) oxylepis, *B. & Br.* Pileo plano depresso squamulis erectis acutis hispido, stipite gracili; annulo flocculoso e sporis fulvo; lamellis arcuatis (no. 909*).

On dead wood. Peradeniya, Jan. 1869.

Pileus ½ an inch across, convex, then plane, tawny, clothed with erect acute scales; stem 1 inch high, 1 line thick; ring floccose, situated near the top, deflexed, tawny from the spores; gills 1 line broad, adnate, arched, tawny; spores obliquely ovate, ·00025′ long.

Belongs to the same section as the two foregoing species.

213. A. (Flammula) dilepis, *B. & Br.* Pileo e convexo umbonato depresso luteo squamulis obsito; stipite curvo glabro pallido farcto; lamellis ventricosis postice sinuatis adnato-decurrentibus flavis (no. 878, cum icone).

On dead wood. Peradeniya, Jan. 1869.

Pileus ¾–1 inch across, convex, umbonate, then depressed, sulphur-coloured, clothed with minute brown scales in the centre, and tawny towards the margin; flesh nearly white; stem 1¼ inch high, 1 line thick, pallid without and within, smooth, slightly swollen at the base; gills 1 line broad, ventricose, sinuated behind, adnato-decurrent, yellow; spores ·00025′ long.

Resembles, in some respects, *A. heliocaes*, B. & Br.

214. A. (Flammula) crocias, *B. & Br.* Cæspitosus; pileo convexo squamulis pilosis erectis obsito; stipite squamuloso; lamellis adnatis latiusculis croceis (no. 1126).

On dead wood. Central Provinces, Feb. 1869,

We have no figure of this species, which appears to be very beautiful. Spores ·00025′ long. Stem sometimes attenuated below, sometimes above.

215. A. (Naucoria) phædropis, *B. & Br.* Pileo e campanulato plano sulcato-striato fulvo; stipite clavato albido fistuloso; lamellis postice rotundatis liberis fulvis (no. 890, cum icone).

On the ground. Peradeniya, Dec. 1868, Jan. 1869.

Pileus ¾ inch across, at first campanulate, then plane, bright tawny; margin sulcato-striate, crenate; stem 1½ inch high, 1 line thick, pallid, fistulose; gills ventricose or falciform, rounded behind, free, bright tawny; spores obliquely ovate, ·0003–·0006′ long by ·0002′–·0003′. Turns to a vinous red in drying.

It belongs to Fries's first section, and is a very pretty bright-looking species.

216. A. (Naucoria) microphues, *B. & Br.* Pileo plano albicante usque ad centrum striato; stipite filiformi albo basi substrigoso, lamellis distantibus liberis (no. 1203, cum icone).

On sandy soil. Peradeniya, July 1869.

Pileus ¼ inch across, plane, at length white, striate up to the centre; margin crenate; stem ¾ inch high, ¼ line thick, filiform; gills segmentiform, free, or nearly free; spores pure, ·0003′ long.

Allied to *A. centunculus*.

217. A. (NAUCORIA) ABJECTUS, *B. & Br.* Pileo e campanulato depresso tenui striato livido griseove; stipite gracili subtiliter fistuloso; lamellis ventricosis luteis (no. 897, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus $\frac{1}{3}$–$\frac{1}{2}$ inch across, campanulate, then plane or slightly depressed, brownish livid, deeply striate; stem $\frac{3}{4}$–1 inch high, not half a line thick, of the same colour, fistulose; gills about half a line broad, clay-coloured, ventricose, adnexed; spores ·000$\dot{3}$′ long.

There is a variety (no. 897*, cum icone) with a grey pileus and rather broader gills and a more slender stem, which is dark at the base.

218. A. (NAUCORIA) PYGMÆUS, *Bull.* (No. 945.)

On rotten wood. Peradeniya, Jan. 1869.

Pileus 2–8 lines across; stem springing from a floccose disk.

219. A. (NAUCORIA) PELIDNUS, *B. & Br.* Pileo conico livido, margine plicato crenato; stipite concolori sursum dilatato roseo-farcto; lamellis ventricosis ascendentibus rubro-rufis (no 854*, cum icone).

On the ground. Peradeniya, Dec. 1868, Jan. 1869.

Pileus $\frac{1}{2}$ inch across, conical, smooth, pinkish, shaded with livid blue; margin plicate; stem $\frac{3}{4}$ inch high, of the same colour, stuffed with pink matter; gills ventricose, ascending, adnexed, reddish; spores ·000$\dot{3}$′ long.

Somewhat resembling a small form of *A. cucumis.*

220. A. (NAUCORIA) CERODES, *Fr.*; *Gardner.* (No. 713, cum icone.)

On the ground. Peradeniya, May 1844.

221. A. (NAUCORIA) PEDIADES, *Fr.*, var. MAJOR. (No. 713, cum icone.)

On the ground. Peradeniya, *Gardner, Thwaites,* Aug.–Sep. 1868.

Pileus 1$\frac{1}{2}$–2$\frac{1}{2}$ inches across, even, pitted, umbonate. It has a strong scent of meal. Spores ·0005′ by ·0004′.

222. A. (NAUCORIA) SEMIORBICULARIS, *Bull.* (No. 839, 930, cum iconibus.)

On the ground amongst micaceous soil. Peradeniya, Dec. 1868.

Spores ·0004′ long.

223. A. (NAUCORIA) CROBULUS, *Fr.* (No. 857, cum icone.)

On dead wood. Peradeniya, Dec. 1868.

Spores ·00035′–·0004′ long.

224. A. (NAUCORIA) FURFURACEUS, *P.* (No. 1182, cum icone; no. 93.)

On dead wood. June 1869.

Spores ·00028′ long.

We consider this a form of the common species.

225. A. (Naucoria) lonchophorus, *B. & Br.* Pileo hemisphærico acute umbonato furfuraceo; stipite subæquali farcto parce furfuraceo; lamellis arcuatis cinnamomeis (no. 835, cum icone).

On dead wood. Dec. 1868.

Pileus 2–3 lines across, convex, tawny, with a very acute elongated umbo; stem ½ an inch or more high, ½ a line thick, of the same colour, dilated upwards, stuffed, then hollow; gills arched, narrow, cinnamon; spores ·00025′ long.

No. 835*** is a variety with a broader, paler pileus and stem, and broader gills.

226. A. (Naucoria) sobrius, *Fr.* (No. 854.)

On the ground. Dec. 1868, Jan. 1869.

227. A. (Naucoria) gnapholopus, *B. & Br.* Pusillus; pileo convexo tabacino tomentoso quandoque particulis flavis obsito; stipite conico albido-velutino; lamellis ventricosis tabacinis flavo-marginatis (no. 957, also with no. 814).

On very decayed wood. Peradeniya, Jan. 1869.

Pileus 3 lines across; stem very short, conical; spores ovate, $\cdot 000\dot{3}'$ long.

228. A. (Naucoria) fulvo-albus, *B. & Br.* Pileo campanulato obtuso fulvo papillis pulverulentis obsito; stipite gracili subtiliter fistuloso candido; lamellis ventricosis fulvis (no. 889, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus ¼ inch across, campanulate, sometimes contracted in the centre, tawny, darker above, clothed with minute pulverulent papillæ; stem ⅔ inch high, ⅓ line thick, white, pulverulent; gills tawny, ventricose, ¾ line broad; spores clay-coloured, ·0002′ long.

Allied to *A. conspersus.*

229. A. (Naucoria) ochrus, *B. & Br.* Ochraceus; pileo plano verrucis pulveraceis obsito; stipite e farcto cavo furfuraceo; lamellis ventricosis adnexis (no. 1175, cum icone).

On the ground. June 1869.

Pale ochre; pileus ¾ inch across, rough, with little pulveraceous warts; flesh brownish; stem 1½ inch high, nearly a line thick, stuffed, then hollow, pulverulent; gills a line broad, ventricose, rounded behind, slightly adnexed; spores ·0001′–·0002′ long by ·00015′.

Allied to *A. conspersus, escharoides,* and *limbatus.*

230. A. (Naucoria) heliocaes, *B. & Br.* Pileo convexo tarde depresso subcarnoso punctato ochraceo; stipite subæquali farcto glabro albido; lamellis adnatis pallide ferrugineis (no. 859, cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus 1–1½ inch across, convex, sometimes at length depressed, ochraceous, freckled, flesh white except immediately under the cuticle; stem flexuous, 1½–2 inches high, 1–2 lines thick, stuffed, but not medullate, nearly white, smooth; gills 1–2 lines wide, distant, ochraceous, segmentiform, adnate, sometimes slightly ventricose; spores ·0002′–·00025′ long; mycelium fibrous, white.

231. A. (NAUCORIA) SIENNOPHYLLUS, *B. & Br.* Pileo plano umbrino pulverulento, margine crenato; stipite gracili fistuloso; lamellis adnatis nitide cinnamomeis (no. 833).

On the ground. Peradeniya, Jan. 1869.

Pileus ¾ inch across; stem 1½ inch high, not a line thick; gills 1 line wide; spores oblong, ·00038′ long.

232. A. (GALERA) GLAUCOPURPUREUS, *B. & Br.* Pileo plano depresso mucoso luride cæruleo-purpureo striato; stipite subæquali candido; lamellis pallide fuscis, sporis elongatis metulæformibus (no. 952).

On very decayed wood. Dec. 1868.

Pileus 1 inch across, plane, at length slightly depressed, striate, mucous, dull blue-purple; stem 1 inch high, scarcely a line thick, white, stuffed; gills narrow, pale brown, free; spores ·0006′ long, clear yellow-brown, obliquely lanceolate.

233. A. (GALERA) LATERITIUS, *Fr.* (No. 711, cum icone.)

On the ground. Peradeniya, Sep. 1868.

A large form, approaching, in general appearance, *A. apalus*, but with tawny pileus and stem; gills narrow, spores ·0005′ long.

234. A. (GALERA) SILIGINEUS, *Fr.*; *Gardn.* (No. 40, cum icone.)

On fallen flowers of *Caryota urens.* Peradeniya, June 1844.

235. A. (CREPIDOTUS) HEPATIZON, *B. in Lond. Journ.* vi. p. 416; *Gardn.* (No. 52, cum icone.)

On decayed wood. Hautane Range, June 1844.

236. A. (CREPIDOTUS) PHÆOPHYLLUS, *B. l. c.*; *Gardn.* (no. 36, cum icone); *Thwaites* (no. 87).

On decayed wood. Hautane range, June 1844; Peradeniya, July, Dec. 1868.

Spores ·00025′–·0003′ long.

237. A. (CREPIDOTUS) EPICROCINUS, *B. & Br.* Pileo e resupinato reflexo, supra nitide croceo tomentoso suborbiculari floccis albis affixo, margine undulato-crenato; stipite nullo; lamellis pallide ferrugineis (no. 954, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus ¾–1 inch across, suborbicular or reniform, at first resupinate, then reflexed, bright orange-chrome-yellow, tomentose, at first fixed by a few white flocci, sometimes slightly lobed, sulcate when dry; gills pale ferruginous; spores subglobose, ·0004′ in diameter.

A very beautiful species.

There is a variety with a dull ferruginous pileus and broader gills. The spores are of the same size (no. 954 *b*).

238. A. (Crepidotus) flavo-marginatus, *B. & Br.* Pileo suborbiculari aurantiaco; stipite brevissimo; lamellis latis distantibus postice subtruncatis e sporis rufo-ferruginatis, margine floccoso flavo (no. 392).

On dead wood. Peradeniya, Dec. 1868.

Pileus ½ an inch across, nearly orbicular, orange-yellow; stem very short or obsolete; gills distant, broad, densely clothed with the bright ferruginous spores; margin like that of the pileus, yellow, floccose; spores subglobose, ·0004′ long; when seen laterally, as in many other Agarics, meniscoid.

239. A. (Crepidotus) grumoso-pilosus, *B. & Br.* Pileo suborbiculari e resupinato reflexo albido pilis grumosis fasciculatis ferrugineis conspurcato, margine striato; stipite brevissimo l. obsoleto; lamellis latis ventricosis ferrugineis (no. 954 *a*, cum icone).

On dead wood. Jan. 1869.

Pileus 1–1¾ inch broad, suborbicular or reniform, rarely flabelliform, at first resupinate, then reflexed, white, striate, at first marked with radiating matted hairs which gradually acquire a more or less ferruginous tint and form scattered spots; stem very short or quite obsolete; gills 2 lines or more broad, ventricose, pale ferruginous; spores ovate or subglobose, ·00028′–·0004′ long by ·0002′–·00025′ broad.

240. A. (Psalliota) crocopeplus, *B. & Br.* Pileo conico carnoso squamulis erectis croceis obsito; stipite subæquali dense fulvo-lanato; annulo superiore; lamellis atro-rubentibus liberis, no, 696, 716 (no. 1210, cum icone).

On the ground. July, Aug. 1868, May 1869.

Pileus 2 inches across, conical, fleshy, tawny, covered with erect scales of the same colour, which extend beyond the margin; stem 2 inches high, 2 lines thick, nearly equal, hollow, densely clothed, especially in the centre, with tawny down; ring ample, superior; gills 1½ line broad, brown-purple, free; spores ·0003′ by ·0002′ obliquely ovate, curved.

A magnificent species.

241. A. (Psalliota) campestris, *L.*; *Gardn.* (No. 19.)

On the ground in open places. Peradeniya, June 1844.

Var. pileo nitide piloso-squamoso, annulo amplissimo descendente, stipite albo-farcto; lamellis postice rotundatis (no. 763, cum icone).

Var. pileo squamis basi fibrilloso-radiantibus; stipite farcto demum cavo deorsum brunneo fibrilloso (no. 1155, cum icone). July 1869.

242. A. (Psalliota) didactylus, *B. & Br.* Pileo convexo carnoso piloso-squamoso squamis superioribus erectis; stipite bulboso deorsum floccoso-maculato candido penetrante annulo amplo descendente duplici; lamellis utrinque attenuatis (no. 706, cum icone).

On the ground. Peradeniya, July 1868.

Pileus 4 inches across, convex, fleshy, clothed with pilose scales, of which those in the centre are erect, brownish; stem 5 inches high, ½ inch thick, bulbous, attenuated upwards, stuffed, sunk above into the flesh of the pileus, clothed with transverse patches of white flocci; ring large, superior, reaching halfway down, double; gills moderately broad, attenuated at either end, brown.

Resembling *A. arvensis* in the double ring, *A. cretaceus* in the penetrating stem.

243. A. (Psalliota) spilocephalus, *B. & Br. in Linn. Tr.* xxvii. p. 152. (No. 698, cum icone.)

On the ground.

Inside of the stem consisting of loose intricate threads; spores ·0002′ long.

244. A. (Psalliota) trachodes, *B. in Lond. Journ.* vi. p. 487; *Gardn.* (no. 64, cum icone); *Thwaites* (no. 911, cum icone).

On the ground in shady places. Peradeniya, July 1844, Jan. 1869.

245. A. (Psalliota) lasiophrys, *B. & Br.* Pileo conico lateritio squamulis floccosis ubique obsito, stipite concolori subæquali annuloque fibrillosis; lamellis pallidis ventricosis postice rotundatis (no. 913, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus 3½ inches across, broadly conical, fleshy, thin towards the margin, clothed with little, brick-red, pilose scales; stem 3 inches high, ¼ thick in the middle, truncate at the base, stuffed, clothed with red fibrillæ, ring fibrillose; gills 3½ lines broad, pale purple-brown, ventricose, rounded behind; spores ·0002′ long. Whole plant dark red when dry.

246. A. (Psalliota) hemilasius, *B. & Br.* Pileo carnoso convexo dilatato squamulis pilosis sublateritiis toto obsito; stipite irregulari deorsum tumido glabro; annulo ascendente amplo lacerato; lamellis utrinque attenuatis remotis cinereis (no. 912, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus 4 inches across, convex, fleshy; flesh white, slightly stained; stem 5 inches high, nearly 1 inch thick in the middle, swollen and

undulated below, white, slightly tinged or striated with umber, stuffed; gills 2 lines wide, attenuated at either end, leaving a free space round the top of the stem; spores ·00015′ long.

Compared with *A. simulans*, the ring is different, the spores more minute, nor does it become tawny in drying. *A. spilocephalus* has broad gills, a descending ring, and is stuffed with loose intricate threads.

247. A. (Psalliota) endoxanthus, *B. & Br.* Pileo e companulato plano-depresso. Epidermide brunnea in squamas squamulasve rupta; stipite sursum attenuato fibroso-farcto, carne basis nitide flava; annulo amplissimo, lamellis postice rotundatis atro-purpureis (no. 787, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 3 inches across, at first campanulate, then plano-depressed, pinkish, the brown cuticle broken up into broad or minute scales; flesh moderately thick, white, stained with brown; stem 2–3 inches high, $\frac{1}{3}$–$\frac{1}{2}$ inch thick, rather dingy, attenuated upwards, truncate at the base, stuffed with white threads, bright yellow within towards the base; ring large, deflexed, persistent; gills moderately broad, ventricose, purple-brown; spores ·0002.

Nos. 761, 762 agree in all points except that the stem is not yellow within. The spores vary from ·0002′ to ·0003′ long. Sep. 1868.

248. A. (Psalliota) actinorachis, *B. & Br.* Pileo convexo carnoso, epidermide in fragmenta radiantia punctata rupta; stipite valido radicante glabro farcto; annulo magno descendente; lamellis arcuatis postice attenuatis (no. 875, cum icone).

On the ground. Jan. 1869.

Pileus 3 inches across, convex, slightly depressed, fleshy, cuticle brownish, broken up into radiating minutely squamulose patches, interstices and flesh white; stem 5 inches high, nearly equal, 7 lines thick, smooth, rooting, not truncate, white, pinkish within, stuffed; ring large, white, descending; gills arched, nearly 3 lines broad, attenuated behind, pinkish; spores ·00025′–·0003′ long.

Resembles in many respects the last; but the rooting base and gills are different.

249. A. (Psalliota) simulans, *B. Lond. Journ.* vi. p. 487; *Gardn.* (no. 79); *Thwaites* (no. 764, 698, cum icone).

On the ground. Peradeniya, Aug. 1844, Sep. 1868.

Whole plant tawny when dry. Spores ·0003′ long.

250. A. (Psalliota) tornocephalus, *B. & Br.* Pileo campanulato nitido demum plano glabro margine incurvo; stipite sursum atte-

nuato furfuraceo, annulo descendente amplissimo; lamellis angustis utrinque attenuatis fuscis (no. 789, cum icone).

On the ground. Jan. 1869.

Pileus 3–4 inches across, campanulate, regular, very pale lemon-colour, quite smooth, at length plane with the edge incurved; stem 5 inches high, $\frac{1}{3}$ thick in the middle, rather swollen at the base, white, densely floccoso-furfuraceous; ring large, white, descending; mycelium fibrous, white; gills narrow, $1\frac{1}{2}$ line wide, attenuated at either end; spores ·0002′ long.

Turns tawny in drying, but differs from the last in the gills and ring.

251. A. (PSALLIOTA) NYMPHIDIUS, *B. & Br.* Pileo convexo umbonato candido subtiliter squamuloso; stipite flexuoso granulato farcto, annulo descendente amplissimo; lamellis falciformibus postice rotundatis pallide atro-purpureis (no. 872, cum icone).

On the ground. Peradeniya, Dec. 1868.

White. Pileus $1\frac{1}{2}$ inch across, convex, umbonate, fleshy, clothed with very delicate scales; stem flexuous, equal, densely stuffed, almost solid, becoming pinkish at the base; ring very broad, descending; mycelium ample, fibrillose, white; gills $1\frac{1}{2}$ line broad, rounded behind, pale brown-purple.

252. A. (PSALLIOTA) ARVENSIS, *Schæff.*; *Gardn.* (no. 27, cum icone).

On the ground in woods. Hautane, June 1844.

A small form.

253. A. (PSALLIOTA) SILVATICUS, *Schæff.*; *Gardn.* (no. 28, cum icone).

On the ground. Peradeniya, June 1844.

254. A. (PSALLIOTA) BOLORHIZUS, *B. & Br.* Pileo e convexo plano umbonato squamuloso; stipite elongato albo-farcto basi marginato-bulboso; lamellis angustis brunneis (no. 753, cum icone).

On the ground.

Pileus $2\frac{1}{2}$–3 inches across, convex, then plane or depressed, broadly umbonate, dirty pinkish-white, with little brown floccose scales; stem 3 inches high, $2\frac{1}{2}$ lines thick, pinkish, floccose, stuffed, nearly equal, with a subglobose base, which gives out white fibrils; gills not a line broad, brownish; spores ·00025′ long.

The substance of the stem, which is brownish, penetrates that of the pileus, from which it is distinguished by its different tint. There is a form with a nearly smooth pileus.

255. A. (PSALLIOTA) DYSPINES, *B. & Br.* Pileo convexo striato albido maculis punctisve brunneis sordido; stipite clavato, annulo erecto; lamellis carneo-lividis postice rotundatis liberis (no. 717, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus 1¼ inch broad, French-grey, striate, thin, stained with dark specks or blotches, especially in the centre, which is slightly umbonate, but dimpled; stem 2½ inches high, 1 line thick, stuffed; ring narrow, white, erect, pinkish grey; gills ventricose, pink, inclining to cinereous, 1½ line broad; mycelium filamentous; spores ·00025′ long.

There are two forms, one of which is less squamulose and even with narrower paler gills.

256. A. (PSALLIOTA) LITURATUS, *B. & Br.* Pileo plano tenui late umbonato liturato; stipite clavato albo-farcto albo fulvo-tincto; lamellis angustis utrinque attenuatis cinereis (no. 717*, cum icone).

On the ground. Dec. 1868.

Pileus 1¼ inch across, French-grey, marked with little brown fibrillæ, darker in the centre; stem 2½ inches high, 1 line thick in the centre, white, stained with tawny; ring descending; gills narrow, attenuated at either end, cinereous; spores ·0002′ long.

Closely allied to the last, but apparently distinct.

257. A. (PSALLIOTA) CELIDOTUS, *B. & Br.* Pileo convexo umbonato piloso-squamuloso brunneo; stipite clavato radicante fulvo-tincto albo-farcto penetrante; lamellis falciformibus postice attenuatis brunneis (no. 717**, cum icone).

On the ground. Peradeniya, Sep. 1868.

Pileus 1¼ inch across, convex, umbonate brown, with darker pilose squamules; flesh pallid, except above the head of the stem, where it is dark umber; stem 3 inches high, about 2 lines thick in the centre, clavate, rooting, stained with tawny spots, stuffed with white; ring small, descending; gills broad in front, attenuated behind.

There is a dwarf variety, with the pileus whitish, shaded into dark greyish purple, stem white.

258. A. (PSALLIOTA) CHRYSOCYCLUS, *B. & Br.* Pileo convexo papillato-umbonato squamuloso, margine floccis aureis picto appendiculatoque; stipite gracili subæquali nitide aurantiaco-flavo flocculoso e farcto cavo, annulo angusto; lamellis ventricosis approximatis (no. 708, cum icone).

On the ground. Peradeniya, Aug. 1868.

Pileus 1¼ inch across, convex, with a prominent papillæform umbo, white, marked with little scales, which become orange-yellow towards the appendiculate margin; stem 2 inches high, 1 line thick, flexuous, stuffed, then hollow, thickly clothed with orange-yellow flocci, rooting; gills 1½ line broad, French-grey, approximate, at length nearly black.

The yellow margin reminds one of *Hygrophorus chrysodon.* In some respects it resembles *A. crocopeplus.*

259. A. (PSALLIOTA) LEPIOTOIDES, *B. & Br.* Pileo campanulato tenui squamis minutis sursum nigris deorsum dilutioribus vestito; stipite curvo basi bulbilloso, annulo erecto; lamellis ventricosis postice attenuatis liberis (no. 1196, cum icone).

On the ground. July 1869.

Pileus 1 inch or more across, campanulate, thin, clothed with small scales, which are black at the apex and brownish towards the margin; stem 1½ inch high, 1½ line thick, equal, with the exception of the bulb-like base, nearly white, reddish within, hollow; gills 1 line or more wide, brown, slightly ventricose, attenuated behind, free; spores ·00025′ long.

It has somewhat the habit of a *Coprinus*.

260. A. (PSALLIOTA) RHODOCHROUS, *B. & Br.* Pileo primum ovato dein conico-campanulato umbonato subcarnoso carneo; stipite glabro albo-farcto intus extusque rubro; lamellis liberis sanguineis (no. 744, cum icone).

On the ground. Peradeniya, Sep. 1868.

Pileus 1¼–1½ inch across, at first ovate, then conico-campanulate, umbonate, fleshy, of a beautiful flesh-colour; stem 2 inches high, 1 line or more thick, red within and without, stuffed with white; ring ample, descending; gills blood-red, more or less ventricose, attenuated behind in the more conical form, truncate in a form in which the pileus is more expanded, the stem equal, and the ring far more fugitive; spores ·0002 long, brown-purple.

261. A. (PSALLIOTA) ARGINEUS, *B. & Br.* Pusillus; pileo campanulato umbonato glabro substriato albido; stipite flexuoso filiformi concolori; lamellis ventricosis carneis (no. 900, cum icone).

On the ground. Jan. 1869.

Pileus 5 lines across, campanulate, umbonate, dirty white, smooth, slightly striate; stem 1¼ inch high, not ⅓ line thick, flexuous, fistulose; gills narrow, ventricose, flesh-coloured, nearly free; ring fugaceous, situated in the middle of the stem; spores ·0002 long. Turns red in drying.

Habit that of a *Mycena*.

No. 723 appears to be a var., gregarius pileo candido subfloccoso, lamellis pallide umbrinis. Peradeniya, Aug. 1868.

262. A. (PSALLIOTA) MICROCOSMUS, *B. & Br.* Pusillus, gregarius; pileo campanulato late umbonato glabro; stipite curvo cavo, annulo descendente; lamellis ventricosis pallide rubris (no. 1156, cum icone).

On the ground. July 1869.

Gregarious; pileus 2 lines high, white, campanulate, strongly umbonate, umbo reddish brown; flesh thick in the centre, very thin towards the even margin; stem ¾ inch high, ½ line thick, at length hollow, smooth, white or tinged with red; ring proportionally large, descending; gills ventricose, ½ line wide, reddish; spores ·0002′ long. The gills are very dark when dry.

263. A. (Psalliota) plumarius, *B. & Br.* Pusillus; pileo e campanulato convexo papillato-umbonato floccoso-squamuloso; stipite gracili flexuoso subtiliter fistuloso, annulo erecto; lamellis ventricosis umbrino-carneis (no. 191, cum icone).

On banks. Peradeniya, July–Aug. 1868.

Gregarious; pileus ¼–⅓ inch across, at first campanulate, then convex with a little umbo, greyish white, minutely floccoso-squamulose, even; stem 1 inch high, ⅓ line thick, white above, slightly umber below, flexuous, minutely fistulose; ring white, erect; gills pinkish umber; spores ·0002 long. Whole plant dark when dry.

Closely allied to the last. This is just one of the cases in which the spores may have changed colour in drying.

264. A. (Psalliota) callipeplus, *B. & Br.* Pusillus; pileo convexo obtusissimo fuligine violaceo obsito; stipite gracili albo; lamellis carneis ventricosis (no. 853, cum icone).

On the ground. Peradeniya, Dec. 1868.

Gregarious; pileus ⅓ inch across, convex, very obtuse, clothed with violet meal; stem ½ an inch high, ¼ line thick, white, curved, with a narrow cavity springing from radiating white threads; gills ¾ line broad, pinkish, ventricose; spores ·0002 long.

Allied to *A. fumoso-purpureus*; gills much paler. Dark when dry.

265. A. (Psalliota) chloroconius, *B. & Br.* Pusillus; pileo convexo umbonato pulvere viridi farinaceo; stipite gracili subtiliter fistuloso pulverulento; lamellis ventricosis carneis liberis (no. 892, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus ⅓–¾ inch across, at first subcampanulate, then convex, with a papillæform umbo, clothed with green meal; stem ½–1½ inch, equal, or slightly dilated below, pale, clothed here and there with a little green meal; gills ventricose, 1 line broad, rounded behind, free; spores ·00025 long.

There are two forms, one taller with a very slender stem and campanulate pileus, the other with the pileus more expanded and a short, stouter, paler stem.

266. A. (Psalliota) illotus, *B. & Br.* Pileo convexo umbonato carneo-fuligineo carne alba; stipite tenui rubro albo-farcto; lamellis rubris postice rotundatis (no. 896, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus ¾ inch across, convex, subconical, umbonate, red, clothed more or less partially with fuliginous particles; stem 1¼ inch high, 1 line thick, red, stuffed with white; gills 1 line across, red, rounded behind, slightly ventricose; spores ·00015 long.

As in the last case, there is a form with a shorter stem and the margin of the pileus fimbriated.

Var. THYSANOPHORUS. Pileo convexo rubro fimbriato-appendiculato; stipite extus intusque concolori albo-farcto; lamellis angustis.

Pileus ½ inch across; stem ½ inch high; gills scarcely ½ a line across.

267. A. (PSALLIOTA) SUBCITRINUS, *B. & Br.* Pusillus, gregarius; pileo convexo minute umbonato citrino particulis nigris consperso; stipite filiformi citrino particulis citrinis obsito; lamellis ventricosis rubris (no. 852, cum icone).

On decayed vegetable matter. Dec. 1868.

Gregarious; pileus ¼ inch across, convex, minutely umbonate, yellowish, sprinkled with minute black specks; stem ½ inch high, ⅓ line thick, curved, yellow, dusted with yellow particles; gills ventricose, red; spores ·0002 long, brown-purple. Plant red when dry; ring very fugacious.

268. A. (PSALLIOTA) MYRIOSTICTUS, *B. & Br.* Gregarius; pileo hemisphærico obtuso stramineo verrucis minutis pulveraceis obsito; stipite elongato concolori furfuraceo cavo; annulo minute furfuraceo; lamellis stramineis postice rotundatis (no. 833, cum icone).

On the ground. Nov. 1868.

Pileus scarcely ¾ inch across, convex, obtuse, straw-coloured, covered with minute pulveraceous brown warts; stem 2–2½ inches high, ½ line thick, of the same colour, but paler, with brown specks; gills straw-coloured, rounded behind, free; spores ·0002 long.

269. A. (PSALLIOTA) EPIPASTUS, *B. & Br.* Pileo convexo tenui squamuloso flavo-olivaceo pulvere olivaceo insperso; stipite concolori stricto pulverulento fistuloso lamellis brunneolis (no. 756, cum icone).

On the ground. Peradeniya, Sept. 1868.

Gregarious; pileus ¾ inch across, convex, thin (except in the centre), yellow-olive, sprinkled, as is the straight fistulose stem (1½ inch high, ¾ line thick), with olivaceous powder; ring narrow; gills slightly ventricose, 1 line broad, free; spores ·0002 long.

270. A. (PSALLIOTA) ERYTHROSPILA, *B. & Br.* Pileo convexo obtuso albido punctis rubris pulveraceo; stipite stricto candido; annulo erecto; lamellis liberis brunneolis (no. 850, cum icone).

On the ground. Peradeniya, Sept., Dec. 1868.

Pileus ⅓ inch across, convex, subconical, powdered with red particles; stem 1 inch high, ¾ line thick, hollow, white; ring narrow, erect; gills slightly ventricose, brown, free; spores ·0002 long, brown. Dark when dry.

271. A. (Psalliota) rufo-albus, *B. in Journ. of Bot.* vi. p. 488; *Gardn.* (no. 23, cum icone).
On the ground. Peradeniya, June 1844.

272. A. (Psalliota) subæruginosus, *B. & Br.* Pileo convexo umbonato viscidulo demum depresso carnoso ex æruginea flavo-fusco, carne rubescente; stipite glabro candido, annulo angusto; lamellis e subcarneo fuscis adnexis (no. 756, cum icone).
On the ground. Dec. 1868.
Cæspitose; pileus 1¾ inch across, convex, obtusely umbonate, at length depressed, greenish at first, then yellow-brown, minutely scaly; flesh reddish; stem 1½ inch high, ¼ thick, equal or attenuated below, white, smooth, reddish within, stuffed with white; ring narrow; gills rounded behind, adnexed, brownish.

We have no specimens of this species; but the two drawings show very clearly that it is distinct from *A. æruginosus*.

273. A. (Hypholoma) sublateritius, *Fr.*; *Gardn.* (no. 89, cum icone).
On old wood. Hautane Range, Aug. 1844.

274. A. (Hypholoma) fascicularis, *Huds.* (no. 746, 759 cum iconibus); *Gardn.* (no. 45, cum icone).
On dead wood and chips. Peradeniya, June 1844.

275. A. (Psilocybe) cernuus, *Müll.*; *Gardn.* (no. 26, cum icone).
On the ground and attached to twigs. Peradeniya, June 1844.

276. A. (Psilocybe) cano-ruber, *B. & Br.* Pileo plano depresso pellicula atro-rubra e margine striato sericeo pallido deglubato; stipite e farcto cavo; lamellis pallidis horizontalibus postice rotundato-adnatis (no. 842, cum icone).
On the ground. Dec. 1868.
Pileus ¾–1 inch across, plane, slightly depressed, at first clothed with a smooth brown-red skin, which separates from the pale striate silky margin, forming a patch in the centre; stem about 1 inch high, ½ a line thick, brownish or reddish, within reddish, stuffed with white; gills 1½ line wide, horizontal, rounded behind, slightly adnate; spores ·00025 long.

Allied to *A. cano-brunneus*, Fr. Whole plant dark red when dry.

277. A. (Psilocybe) bullaceus, *Bull.* (No. 838, cum icone.)
On dung. Peradeniya, Dec. 1868.

A widely distributed species. We have it from Secunderabad and the United States. The Ceylon specimens have a perfect ring, but the spores are the same as in the ringless specimens. The species evidently varies in this respect as regards European specimens.

278. A. (Psathyra) spadiceo-griseus, *Schæff.* (Nn. 712***, 754, cum iconibus.)
On dead wood. Peradeniya, Aug.–Sep. 1868.
Spores ·00028‴ long.

279. A. (Psathyra) obtusatus, *Fr.* (Nn. 711 *, 712, 829, cum iconibus.)
On dead wood.

Two forms are figured—one with broader ventricose gills and more conical pileus, the other more campanulate. Spores ·0003–·0004 by ·0002–·0003.

280. A. (Psathyra) amaurus, *B. & Br.* Pileo campanulato brunneo tenui glabro profunde striato-sulcato; stipite brevi albido glabro e farcto fistuloso; lamellis ventricosis adnatis purpureo-fuscis (no. 829, cum icone).
On dead wood. Peradeniya, Jan. 1869.
Pileus ½–¾ inch across, campanulate, smooth, thin, deeply sulcato-striate; stem ¾ inch high, 1 line thick, smooth, fistulose, nearly white; gills ventricose, adnate, 1½ line broad, brown-purple; spores ·0003 long.

281. A. (Psathyra) ochreatus, *B. & Br.* Pileo conico-subcampanulato umbonato e griseo candicante hygrophano subcarnoso; stipite subæquali e farcto cavo cinereo; lamellis angustis adnexis atro-purpureis (no. 835****, cum icone).
On dead wood. Peradeniya.
Pileus ¾ inch high, conico-subcampanulate, then expanded, umbonate, grey-brown, turning white above, so as to leave a broad zone near the somewhat lobed margin, smooth, not striate; stem 1 inch high, 1 line thick, cinereous, nearly equal, or slightly dilated above, smooth; gills ½ line broad, brown-purple; spores ·00025 long.

282. A. (Psathyra) efflorescens, *B. & Br.* Gregarius; pileo hemisphærico materie saccharina obsito; stipite curvo tenui e strato tomentoso candido oriundo; lamellis adnatis.
On dead mossy trunks. Peradeniya, Nov. 1867.

Pileus ¼ inch across; spores brown-purple, ·0003 long.

Habit of *A. corticolor*.

283. A. (PSATHYRA) ASCEUUS, *B. & Br.* Pileo ex hemisphærico plano l. depresso sulcato carneo-griseo; stipite curvo gracili subtiliter fistuloso albo; lamellis latis postice rotundatis adnatis (no. 870, cum icone).

On dead wood. Peradeniya, Dec. 1868.

Pileus ¾ inch across, of a dull pinkish grey, sulcate; stem 1 inch high, ½ line thick, curved, white; gills 1½ line wide, pinkish; spores brown-purple, ·00025 long.

Allied to *A. obtusatus*, veilless. No. 718 appears to be the same species with a brownish pileus and whitish stem. Aug. 1868.

284. A. (PSATHYRA) LUCIPETUS, *B. & Br.* Pileo subhemisphærico pallide carneo estriato: stipite curvo glabro fistuloso; lamellis angustis ventricosis postice rotundatis adnatis (no. 895, cum icone).

On dead sticks. Peradeniya, Jan. 1869.

Gregarious; pileus ½ inch across, nearly hemispherical, white, tinged with pink, darker in the centre, margin slightly crenate; stem 1 inch high, ½ line thick, curved, of the same colour as the pileus, smooth, fistulose; gills narrow, ventricose, rounded behind, adnate; spores ovate, ·0003–·0004 long.

There appears to be no trace of a ring; and, like the last, it allied to *A. obtusatus*.

285. A. (PSATHYRA) PORPHYRELLUS, *B. & Br.* Pileo subcampanulato membranaceo atro-purpureo estriato; stipite gracili tubuloso pallido e basi floccosa oriundo; lamellis ventricosis adnatis (no 1152, cum icone).

On the ground. June 1869.

Pileus ⅓ inch across, subcampanulate, purplish, thin; stem 1¼ inch high, not ½ a line thick, pallid, with a central cavity; gills ventricose, 1 line broad, adnate, purplish; spores ·0002 long.

Allied to *A. strictus*, Lasch.

286. A. (PSATHYRA) TYTHUS, *B. & Br.* Pileo convexo atro-purpureo atomato; stipite flexuoso pallido tubuloso; lamellis ventricosis distantibus adnexis carneis (no. 1169, cum icone).

On the ground. July 1869.

Pileus ⅓ inch across, convex, obtuse, at length inverted; flesh rose-coloured; stem ¾ inch high, ½ a line thick, pallid, yellowish within, with a narrow central channel; gills few, ventricose, nearly free, pinkish; spores ·00025 long.

This appears, at first sight, to be a dwarf form of the last;

but the spores are larger. It might perhaps be doubted whether this is not one of those Lepiotæ whose spores turn to a dark purple in drying; but there is not a trace of a ring, either in the drawing or in the specimens.

287. A. (PANÆOLUS) PAPILIONACEUS, *Bull.* (No. 746*.)
On dung. Peradeniya, Dec. 1868.
Spores vary from ·0007 to ·0001 long.

288. A. (PANÆOLUS) CAMPANULATUS, *L.*; *Gardn.* (no. 2, cum icone).
On the ground. Peradeniya, June 1864.

289. A. (PANÆOLUS) CYANESCENS, *B. & Br.* Albidus cyanescens; pileo hemisphærico glabro subcarnoso; stipite recto radicante umbrino farcto; lamellis ascendentibus ventricosis leviter adnatis cyaneo-nigris (no. 746**, cum icone).
On rich manured soil. Peradeniya, Sept., Nov. 1868.
Pileus 1¼ inch across, hemispherical, smooth, dirty white, tinged with yellow-blue, slightly fleshy; flesh turning partially blue; stem 4 inches high, 1½ line thick, straight, rooting, whitish, deeply tinged below with blue, with a few reddish dots at the apex, stuffed with reddish brown, the outer coat turning blue; gills ventricose, ascending, rounded behind, shortly adnate; spores lemon-shaped, ·0004–·0005 long.

290. A. (PANÆOLUS) CALIGINOSUS, *Jungh.* (No. 746***, cum icone.)
On dung. Sept. 1868. With *A. papilionaceus.*
Pileus semiovate to hemispherical, membranaceous, livid; stem straight, livid; gills ventricose, ascending; spores lemon-shaped, ·00035 long.

291. A. (PSATHYRELLA) TIARELLA, *B. & Br.* Pileo conico pallido membranaceo estriato; stipite flexuoso fistuloso pallido; lamellis ascendentibus angustis purpurascentibus (no. 1193, cum icone).
On decayed vegetable matter. July 1869.
Pileus ½ inch across, 1 inch high, dirty white, with the disk umber-coloured, membranaceous; flesh of disk umber; stem 1½ inch high, ⅓ line thick, pale umber, flexuous, fistulose; gills ascending, adnexed, about 1 line broad, purplish, at length nearly black; spores elongated, ·00057 long.
Allied to *A. disseminatus.*

292. A. (PSATHYRELLA) ACHNOUS, *B. & Br.* Gregarius; pileo conico-campanulato albo striato glabro umbone papillæformi umbrino aucto; stipite curvo fistuloso glabro; lamellis angustis ex albo nigris postice attenuatis (no. 774, cum icone).
On dead wood. Jan. 1869.

Densely gregarious; pileus ¼ inch across, white, campanulate, with a papillæform umbo, of a pale umber, deeply striate; stem 1 inch high, curved, fistulose, smooth, with a few reddish hairs at the base; gills at first white, narrow, attenuated behind.

Habit that of *A. disseminatus.*

293. A. (PSATHYRELLA) HIASCENS, *Fr.*; *Gard.* (no. 25, cum icone).

On the ground. Peradeniya, June 1844.

294. A. (PSATHYRELLA) LEPTOSCELES, *B. & Br.* Pileo hemisphærico acute umbonato subtiliter tomentoso usque ad umbonem striato; stipite gracili (no. 770).

On the ground. Peradeniya, Sept. 1868.

Pileus 1 inch across, striated up to the acute or elongated and truncate umbo; stem 2½–3 inches high, ½ line thick; gills ventricose, shortly adnate; spores egg-shaped, ·0003 long.

Allied to *A. hydrophorus.*

295. A. (PSATHYRELLA) AUCTUS, *B. & Br.* Pileo campanulato hispidulo subcinereo umbone papillæformi albo aucto; stipite piloso flexuoso fistuloso; lamellis angustis adnatis (no. 774, cum icone).

On dead wood. Peradeniya. Sept. 1868.

Pileus ½ inch across, campanulate, very pale cinereous, clothed with a few short hairs; umbo white, prominent, papillæform; margin inclined to split; stem 1¼ inch high, not a line thick, fistulose, flexuous, white, pilose; gills narrow, ascending, slightly ventricose, adnate; spores elongated, ·0005 long.

Allied to *A. disseminatus.* There is a smooth, more gregarious form, deeply striate, with the umbo pale umber. Jan. 1869.

296. A. (PSATHYRELLA) CTENODES, *B. & Br.* Pileo campanulato usque ad umbonem plicato-striato; stipite curvo e basi strigosa oriundo subtiliter piloso fistuloso; lamellis carneis adnatis (no. 942**, cum icone).

On dead wood. Jan. 1869.

Pileus ½ inch across, campanulate, of a delicate grey, plicato-sulcate up the small smooth umbo; delicately pilose, as is the fistulose curved stem, which is strigose at the base; stem 1 inch high, ¾ line thick; gills slightly ventricose, ascending, shortly adnate; cystidia large, cylindrical; spores ovate, ·00025–·00035 long. Dark when dry.

297. A. (PSATHYRELLA) DISSEMINATUS, *P.* (no. 776; no. 942, cum icone); *Gard.* (no. 61, cum icone).

On dead wood. Peradeniya, July 1844, Sept. 1868, Jan. 1869.

Spores ·0005 by ·0003.

298. A. (Psathyrella) leptomeres, *B. & Br.* Pileo late campanulato usque ad centrum striato; stipite elongato glabro solido; lamellis angustis adnexis (no. 775).

On dead wood. Peradeniya, Sept. 1868.

Pileus ¾–1 inch across, broadly campanulate, then expanded, striate almost to the apex; stem 1½ inch high, smooth, solid; gills narrow, adnexed; spores narrow, ·000$\dot{3}$–·0004 long by ·00015–·0002.

Allied to *A. subtilis*, but the gills are not adnate.

299. A. (Psathyrella) furfurellus, *B. & Br.* Gregarius, minimus; pileo hemisphærico furfurello; stipite capillari tomentoso; lamellis adnatis e pallido nigris (no. 944).

On dead wood. Peradeniya, Jan. 1869.

Pileus not a line across, hemispherical, clothed with delicate furfuraceous particles, as is the thread-like stem ¼ inch high. Spores ·000$\dot{2}$ long.

300. Hiatula flosculus, *B. & Br.* Candida; pileo plano usque ad centrum plicato, fibrillis hic illic obsito; stipite brevi e basi orbiculari oriundo; lamellis niveis (no. 905, cum icone).

On dead wood. Peradeniya, Jan. 1869.

White; pileus 2–5 lines across, plicato-sulcate, clothed with a few scattered fibrils; stem 1–2 lines high, springing from an orbicular base; spores ovate, ·000$\dot{3}$ long.

Rhacophyllus, n. g.

Pileus tenuissimus, tenerrimus; lamellæ in fragmenta oblongo-obtusa flexuosa divisæ.

301. R. lilacinus, *B. & Br.* (No. 825, cum icone.)

On dead wood, twigs, &c. Peradeniya, Dec. 1868, Jan. 1869.

Pileus cylindrical or digitaliform, lilac, striate, or even split more or less at the margin; stem dilated at the base, attenuated upwards; gills replaced by numberless oblong, irregular, waved, obtuse lobes, of the same colour as the pileus.

It is possible that there may be two species; but the number of specimens gathered at present is very small. *Pterophyllum*, Mont., agrees somewhat in character; but it is closely allied to *Panus*, while this is more closely to *Coprinus*.

302. Coprinus fuscescens, *Fr.* (No. 1001, cum icone.)

On manured soil.

No specimens were preserved of this deliquescent fungus; but the drawing agrees with *C. fuscescens*, Fr., except that the flesh is very thin at the apex of the stem. The gills, as in that, are strongly attenuated to the margin of the pileus.

303. C. FIBRILLOSUS, *B. & Br.* Pileo semiovato squamis innatis fibrillosis obsito; stipite curvo subfloccoso; lamellis ascendentibus arcuatis fuscis adnexis (no. 940).

On the ground. Peradeniya, Jan. 1869.

Pileus ⅓ inch across; stem 1½ inch high; gills narrow; spores ·0002 long.

304. C. MICROSPORUS, *B. & Br.* Pileo campanulato obtuso squamulis innatis fibrosis vestito; stipite incurvo fistuloso; lamellis segmentiformibus pallidis tarde nigricantibus; sporis minimis (no. 1197, cum icone).

On soil. July 1869.

Pileus about ½ an inch across, dirty-white, campanulate, obtuse, clothed with scattered, innate, fibrous, pale-umber scales; stem 1⅓ inch high, about a line thick, flexuous, smooth, fistulose; gills 1 line broad, ascending, at first white, with a tinge of red, free; spores subelliptic, pale, ·00016 long.

305. C. EXTINCTORUS, *Fr.* (No. 844 in part; no. 848, cum icone.)

On fragments of decaying vegetables. Peradeniya, Dec. 1868.

This appears to be a small form of the European species. At least we can find no distinctive characters. The gills are at length of a deep red-brown; spores narrow, ·0004 long; stem obtuse at the base.

306. C. TOMENTOSUS, *Fr.* (No. 844 in part, no. 773.)

On the ground. Peradeniya, Dec. 1868.

307. C. MACROPUS, *B. & Br.* Pileo campanulato striato brunneo floccis albis secedentibus primum obsito; stipite candido fistuloso subradicante glabro; lamellis angustis segmentiformibus adnexis brunneis (no. 783, cum icone).

On the ground.

Deliquescent; pileus nearly 3 inches across, at length turned up at the edge; stem 6 inches high, ¼ inch thick; gills 2 lines broad.

308. C. RUBECULA, *B. & Br.* Pileo juniore ovato squamulis acutis castaneis ornato, seniore campanulato vix striato; lamellis ventricosis liberis; stipite fistuloso (no. 1216, cum icone).

On decaying vegetable matter. Aug. 1869.

Pileus at first broadly egg-shaped, covered with chestnut-coloured acute scales, and resembling a robin's egg, then campanulate, ½ an inch high, and nearly as much across; margin scarcely striate, white, with a cinereous tinge, squamulose above; stem 1 inch high, 1 line thick, white, smooth, fistulose; gills ventricose, free, tinged with red below.

309. C. PALLIDUS, *B. & Br.* Pileo inæquali subcylindrico pallido,

disco lævi umbrino; stipite flexuoso fistuloso pallido; lamellis subliberis fuscis (no. 1157, cum icone).

On dead wood. July 1869.

Pileus 3 lines across, 5 high, pale umber, disk even, much dark, its edges reflected; stem flexuous, 1½ inch high, 1 line thick, fistulose, equal, smooth, pale umber, truncate at the base; gills 1 line wide, umber, then dark brown, slightly ventricose, nearly free; spores ·000$\dot{3}$ long.

310. C. SETULOSUS, *B. & Br.* Pileo cylindrico campanulato obtuso usque ad discum striato setis fulvis undique obsito; stipite fistuloso candido sursum attenuato; lamellis angustissimis adnexis (no. 845, cum icone; no. 936).

On dead vegetable matter. Peradeniya, Dec. 1868, Jan. 1869.

Pileus 5 lines high, 2 broad at the base, cylindrico-campanulate, obtuse, striate up to the pale broad disk, beset everywhere with short tawny bristles; stem 1 inch high, ½ line thick in the middle, white, fistulose; gills ascending, very narrow, not perfectly developed in the specimens, where they are white and without spores.

311. C. CASTANEUS, *B. & Br.* Pileo digitaliformi pallide castaneo glabro; stipite sursum attenuato basi truncato glabro eximie fistuloso; lamellis angustis ascendentibus adnatis (no. 935, cum icone).

On the ground. Peradeniya, Jan. 1869.

Pileus ⅓ inch across, ⅔ high, pale chestnut, smooth, slightly fleshy; flesh of the same colour; stem 3 inches high, 2 lines thick in the centre, incrassated and truncate at the base, smooth, fistulose, white without and within; gills scarcely 1 line broad, pallid.

As in the last, the spores are not developed. The pileus becomes of a bright chestnut when dry.

312. C. FIMBRIATUS, *B. & Br.* Pileo campanulato tomentoso, margine albo-fimbriato; stipite æquali fistuloso; lamellis adnatis (nos. 705, 808).

On dung. Peradeniya, Aug. 1868.

Pileus ½ an inch or more across, campanulate, tomentose, splitting along the back of the gills, fringed with white hairs; stem 2 inches high, white, equal, fistulose; gills moderately broad, adnate; edge white; spores ·000$\dot{3}$ long.

Allied to *C. stercoreus.*

313. C. PACHYTERUS, *B. & Br.* Pileo persistenter campanulato plicato-sulcato; stipite firmiore; lamellis arcuatis adnexis (no. 806).

On the ground. Peradeniya, Oct. 1868.

Pileus 2 inches across, smooth, plicato-sulcate; stem 2½–3 inches high, stouter than in *C. plicatilis*; gills arcuate, adnexed; spores ·0006 long, darker, larger, and longer than in that species.

There are two different species sent under the same number, with spores ·000$\dot{3}$; but we are unable to characterize them without figures.

314. C. PLICATILIS, *Fr.* (No. 715, cum icone.)
On the ground. Peradeniya, Aug.–Sept. 1868.
Spores ·0003–·00045 by ·0002–·00035.

315. BOLBITIUS FISSUS, *B. & Br.* Pileo e campanulato umbonato plano pallido striato margine fisso; stipite fistuloso sursum attenuato l. subæquali candido; lamellis ventricosis argillaceis (no. 931, cum icone).
On dung. Peradeniya, Jan. 1869.
Pileus 1½–1¾ across, very pale gilvous, at first campanulate, papillato-umbonate, then plane; margin striate, splitting; flesh very thin, except in the centre; stem 1½–2½ inches high, incrassated at the base, nearly equal, fistulose, white; gills clay-coloured, ventricose, rounded behind, nearly free; spores ovate. ·000$\dot{3}$ long.

It has not the slightest gamboge-yellow tint.

316. HYGROPHORUS CINERASCENS, *B. & Br.* Pileo irregulari flexuoso depresso glabro lævi subcinereo; stipite sursum dilatato compresso e farcto cavo albo; lamellis ventricosis decurrentibus albidis (no. 1198, cum icone).
On the ground. July 1869.
Subcæspitose; pileus ¾–1¼ inch across, undulated, irregular, even, smooth, pale cinereous; flesh brownish, especially towards the margin; stem ¾ inch high, ¼ thick at the apex, 1½ line at the base, stuffed, then hollow, compressed, white, smooth; gills white, or dirty white, slightly ventricose, truly decurrent, ·0003 by ·00015.

317. H. MULTICOLOR, *B. & Br.* Pileo convexo umbonato glabro, margine tenui estriato livido, carne cærulescente; stipite subæquali flexuoso anguste cavo; lamellis ventricosis lividis adnato decurrentibus (no. 899, cum icone).
On the ground. Jan. 1869.
Pileus ⅔ inch across, greenish, shaded with pink, umbonate; flesh blue; stem 1½ inch high, 1 line thick, with a narrow cavity, flexuous, somewhat attenuated at the base, greenish above, straw-coloured below; gills ventricose, greenish, adnate, decurrent.

Analogous to *H. psittacinus.* This is perhaps another representative of Fries's second section, and, indeed, makes a near approach to *Hygrocybe.*

318. H. LÆTUS, *Fr.* (No. 1209, cum icone.)
On the ground. July 1869.
Spores ·00035–·0004 long by ·00025–·0003 wide.

319. H. ALLICIENS, *B. & Br.* Pileo convexo centro depresso carneo-striato subcarnoso; stipite glabro æquali farcto demum cavo; lamellis carneis decurrentibus (no. 815, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus ¾–1 inch across, pink, with darker striæ, convex, depressed in the centre, fleshy; flesh white; stem 1¼ inch high, 1 line thick, smooth, red above, yellowish below, stuffed, then hollow; scarlet within above, gills arched, shortly decurrent, rose-coloured.

A very beautiful species, near *H. cantharellus* and *sciophanus.*

320. H. PRASINUS, *B. & Br.* Extus intusque viridis; pileo depresso subcarnoso striato; stipite recto glabro cavo; lamellis ventricosis decurrentibus (no. 866, cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus ¾ inch across, depressed, striate; stem 1–1¼ inch high, 1 line thick, nearly equal, hollow; gills 1 line wide, slightly ventricose, decurrent.

321. H. NIVOSUS, *B. & Br.* Niveus; pileo e convexo plano tenui subumbonato striato; stipite flexuoso farcto; lamellis angustis utrinque attenuatis subdecurrentibus (no. 904, cum icone).

On the ground. Peradeniya, Jan. 1869.

Snow-white; pileus ½–1 inch across, at first campanulate, then plane, subumbonate, thin, smooth, shortly striate, not the least umbilicate; stem 1 inch high, ¾ line thick, stuffed; gills ½ line broad, attenuated at either end, scarcely decurrent.

No. 877 is apparently a large form of the same species, "dull transparent white." Rather allied to *H. lætus* and *H. virgineus.*

322. H. ALUTACEUS, *B. & Br.* Pileo umbilicato glabro; margine arcuato striato; stipite obconico; lamellis arcuatis longe decurrentibus alutaceis (no. 800*).

On the ground. Peradeniya, Jan. 1869.

Pileus 1 inch across; stem 2 inches high, attenuated at the base, dilated upwards, stuffed; gills arched, truly decurrent, tan-coloured.

323. H. FIRMUS, *B. & Br.* Flavus; pileo depresso subtiliter tomentoso; stipite sursum dilatato cavo; lamellis segmentiformibus decurrentibus (no. 880).

On the ground. Peradeniya, Jan. 1869.

Yellow, minutely tomentose; pileus 1 inch or more across, umbilicate, margin arched; stem 1½ inch high, obconical; gills strongly decurrent.

Under the same number is another species, or variety, with the pileus less decidedly yellow, the gills arched, very decurrent, and pale buff.

324. H. CERACEUS, *Fr.*
Var. *moschatus, B. & Br.* (No. 812).
On the ground. Peradeniya, Nov. 1868.

The only point in which this differs from the European species is the strong musky scent; "but this may possibly be due to a musk-rat having passed over the plat."

325. H. PYGMÆUS, *B. & Br.* Pusillus; pileo coccineo glabro viscoso; stipite subæquali lamellisque paucis arcuatis decurrentibus pallidioribus (no. 928, cum icone).
On very rotten wood. Peradeniya, Jan. 1869.
Pileus 1–4 lines across, convex, bright scarlet, viscid; stem 1½–3 lines high, ½ a line thick, a little incrassated at the base, smooth, pale, as are the distant, arched, decurrent gills.

326. H. MINIATUS, *Fr.* (No. 816, cum icone.)
On the ground. Peradeniya, Dec. 1868.
A small form resembling *Agaricus coccinellus*, Ehrb.
Spores ·0003 long.

327. H. ROSEO-STRIATUS, *B. & Br.* Pileo hemisphærico subcarnoso tenui toto roseo-striato; stipite compresso fistuloso lævi; lamellis paucis adnatis planis (no. 812, cum icone).
On the ground. Dec. 1868.
Pileus hemispherical, 1 inch across, yellowish, pink marked with salmon-coloured streaks; stem 2 inches high, ¼ thick, nearly equal, slightly flexuous, yellowish, with a red tinge; gills of the same colour as the stem, nearly plane, adnate, few in number.
The habit is nearly that of *H. chlorophanus.*

328. H. OBRUSSEUS, *Fr.*; *Gardn.* (no. 70).
On the ground in woods. July 1844.

329. H. CONICUS, *Fr.* (No. 813, cum icone.)
On the ground. Peradeniya, Nov. 1868.
Var. pileo campanulato carnoso obtuso luteo nigro-virgato, carne sub cuticula cinerascente; stipite æquali concolori solido; lamellis attenuato-liberis citrinis.

330. H. CINEREUS, *B. & Br.* Pileo conico obtuso cinereo glabro; carne alba; stipite deorsum attenuato farcto glabro candido; lamellis attenuato-adnexis (no. 1195, cum icone; no. 205).
On the ground. Jan. 1869.
Pileus ¾ inch across, conical, obtuse, smooth, cinereous; flesh in the centre thick, white; stem 1¼ inch high, ¼ thick in the centre, stuffed, white; gills pallid, slightly ventricose, even, attenuated behind, adnexed.

Not closely allied to any described species. No. 235 is paler than no. 1195.

331. H. BICOLOR, *B. & Br.* Pileo e conico-campanulato coccineo, margine lobato, carne alba; stipite æquali e farcto cavo glabro; lamellis pallidis undulatis attenuato-adnexis (no. 702, cum icone).

On the ground. Peradeniya, July, Aug. 1868.

Pileus 1 inch or more across, conico-campanulate, obtusely umbonate, then expanded, scarlet, becoming paler above; flesh thin, white; stem 2½ inches high, about 2 lines thick, smooth, striate, equal, stuffed, then hollow, white within; gills pallid, undulated, narrow, attenuated behind, adnexed.

Allied to *H. calyptræformis.*

Spores ·0002 by ·0001.

332. H. ELEGANTISSIMUS, *B. & Br.* Roseus; pileo conico-campanulato, umbone acuto, margine extremo undulato rufescente; stipite fistuloso; lamellis undulatis attenuato-adnexis (no. 865, cum icone).

On the ground. Jan. 1869.

Rose-coloured; pileus 1 inch or more across, conico-campanulate, streaked, umbo acute; extreme margin rich sienna-brown, slightly undulated; stem 3 inches high, 2½ lines thick, smooth, fistulose, attenuated below, smooth; gills ventricose, undulated, uneven, attenuated behind, adnexed.

Allied to the last.

333. H. APALUS, *B. & Br.* Pileo conico estriato carnoso subacute umbonato tenui; stipite æquali solido candido lamellis late ventricosis adnexis niveis (no. 1204, cum icone).

On the ground. July 1869.

Pileus 1–1¼ inch across, conical, rather acutely umbonate, smooth, even, fleshy, thin towards the margin, of a delicate clear lemon-colour, darker at the umbo; stem 1½ inch high, 2 lines thick, even, smooth, white, solid; gills broadly ventricose, slightly undulated, adnexed, white; flesh very pale lemon-coloured.

A very delicate species, differing from any with which it might be confounded in its strictly solid stem, which is distinct in colour from the flesh of the pileus.

Spores ·0005 by ·0003.

334. H. ALWISII, *B. & Br.* Pileo conico carnoso tenui virgato albido, margine crenato; stipite sulcato glabro æquali solido; lamellis attenuato-adnexis antice ventricosis candidis (no. 814, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 2 inches across, conical, white, here and there tinged with yellow-brown, especially at the obtuse fleshy umbo; stem nearly 3 inches high, ¼ thick, twisted, sulcate, smooth, white, solid; gills white, broad in front, attenuated behind, adnexed.

Habit like that of *H. conicus.* The specific name refers to Mr. W. De Alwis, who has drawn the fleshy fungi of Ceylon so exquisitely.

335. H. CÆSIUS, *B. & Br.* Pileo campanulato obtuso demum apice rupto livido striato, carne cæsia; stipite glabro eximie fistuloso basi dilatato; lamellis undulatis adnexis cæsiis (no. 856, cum icone).

On the ground. Peradeniya, Dec. 1868.

Pileus campanulate, 1 inch across, livid, smooth, striate, splitting at the apex; margin lobed; flesh thin, glaucous; stem 1½ inch high, ¼ thick, dilated and truncate at the base, fistulose, sometimes pervious above from the rupture of the flesh of the pileus, smooth, even, white, with a livid glaucous tinge; gills undulated, blue, distant, adnexed.

336. H. TRICOLOR, *B. & Br.* Pileo primum digitaliformi demum expanso umbonato glabro; stipite candido subcavo glabro; lamellis versicoloribus truncato-adnexis (no. 794, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 1½–1¾ inch across, at first obtusely conical, yellow in the centre, scarlet towards the lobed margin, then expanded, umbonate, slightly striate, smooth; flesh reddish beneath the cuticle; stem 2 inches high, ¼–⅓ thick, nearly equal, white, smooth, stuffed; gills ventricose, truncate behind, adnexed, variously shaded with yellow and red.

Allied to *H. puniceus*, but a much smaller species.

Spores ·00035–·0004 long, broadly elliptic.

337. H. CHLOROPHANUS, *Fr.* (No. 812.)

On the ground.

338. H. GLANDULÆFORMIS, *B. & Br.* Cæspitosus; pileo campanulato obtuso estriato glabro demum centro depresso aurantiaco; stipite fistuloso basi attenuato glabro citrino; lamellis postice rotundatis citrinis (no. 879, cum icone).

On the ground. Jan. 1869.

Pileus 1 inch across, at first acorn-shaped, then depressed in the centre, bright orange, smooth, not striate; flesh thin, lemon-coloured; stem 2 inches high, ½ or more thick, fistulose, attenuated and obtuse at the base, with a little rooting down; walls rough, with little shreds; gills rounded behind, free, lemon-coloured.

This seems to be a distinct type.

339. RUSSULA PERIGLYPTA, *B. & Br.* Candidus; pileo hemisphærico viscido umbilicato sulcato; stipite deorsum angustato solido; lamellis arcuatis postice acutis attingentibus (no. 800, cum icone).

On the ground. Peradeniya, Nov. 1868.

Pileus 2½ inches across, hemispherical, viscid, margin regularly and strongly sulcate; stem nearly 3 inches high, ¾ thick in the middle, attenuated at the base, somewhat swollen in the centre, solid; gills regular, arched, ¼ inch wide, acute behind, reaching to the top of stem; interstices reticulate.

Very regular in form.

Spores globose, echinulate, ·00025 in diameter †.

340. R. EMETICA, *Fr.*; *Gardn.* (no. 87, cum icone).

On the ground. Hautane, Aug. 1844.

341. CANTHARELLUS STOLONIFER, *B. & Br.* Pileo convexo umbilicato cinereo tomento adpresso insperso; stipite recto candido cavo; plicis angustis candidis decurrentibus, interstitiis parce reticulatis; mycelio crasso filiformi (no. 751*, cum icone).

Peradeniya, Dec. 1868.

Pileus 1 inch across, convex, umbilicate, dark, cinereous, rough, with adpressed matted fascicles of down, thin, at length pallid; stem 1¼ inch high, 2 lines thick, smooth, white, compressed, hollow, throwing out at the base stringy threads, which occasionally bear reproductive knots; folds narrow, decurrent, white; interstices slightly reticulated or nearly even.

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† The decimals in this paper are all parts of an English inch.

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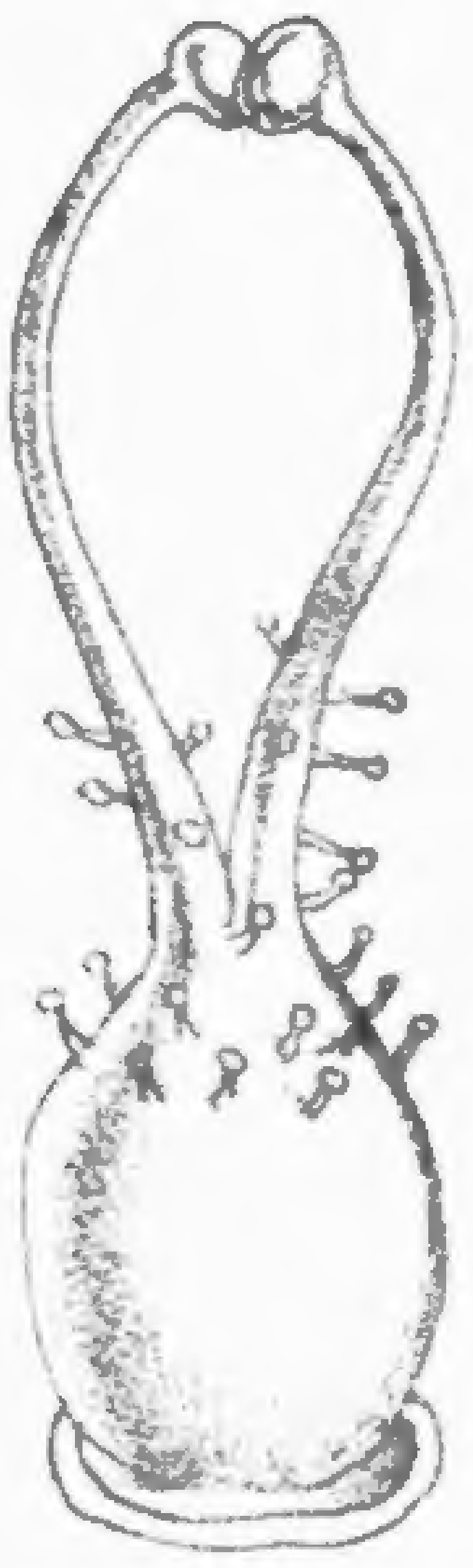

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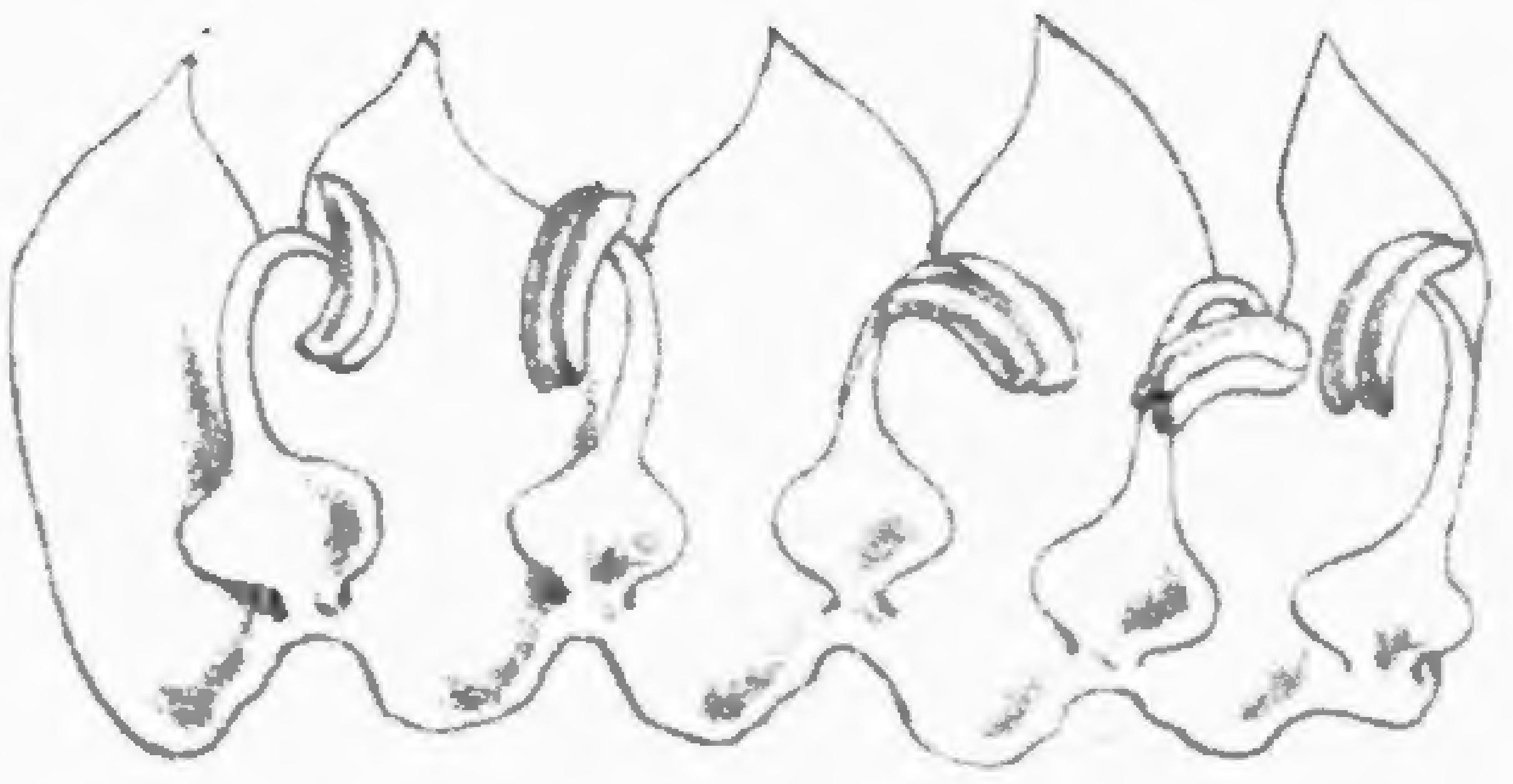

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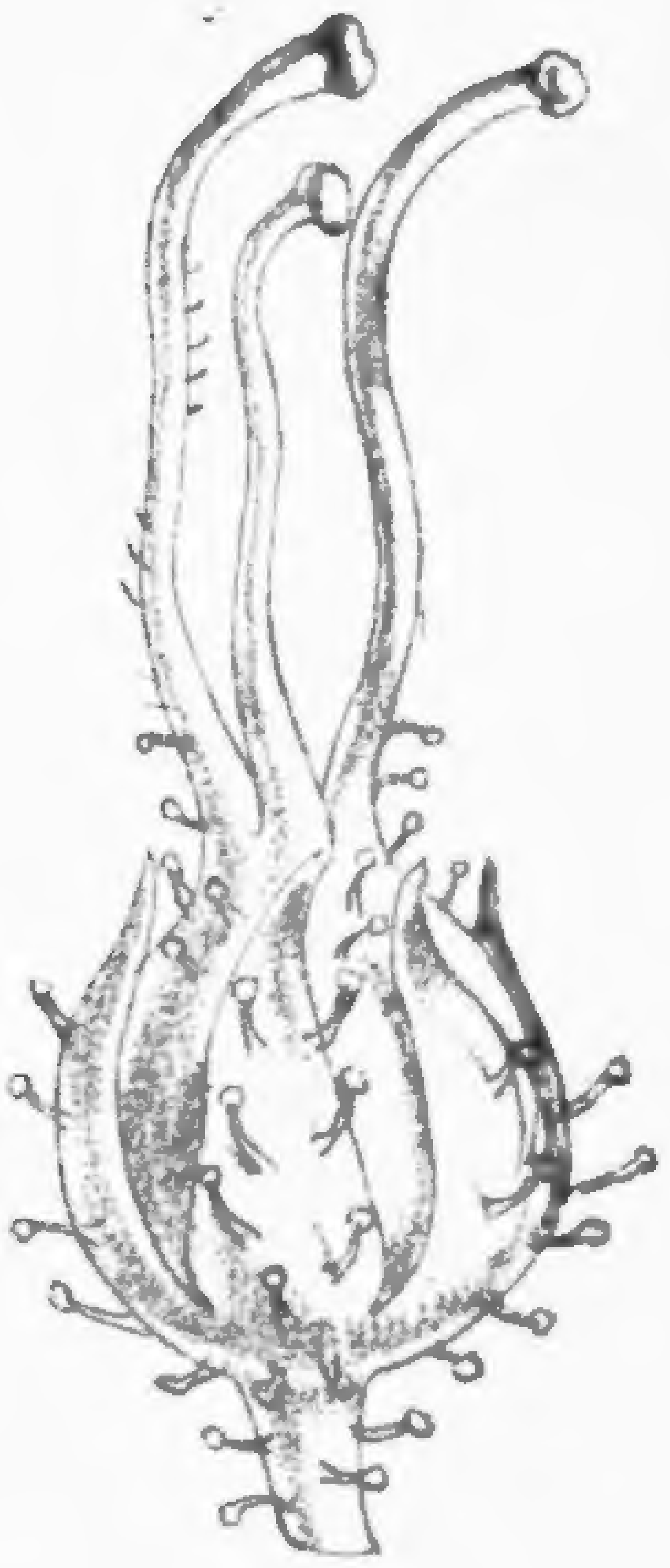

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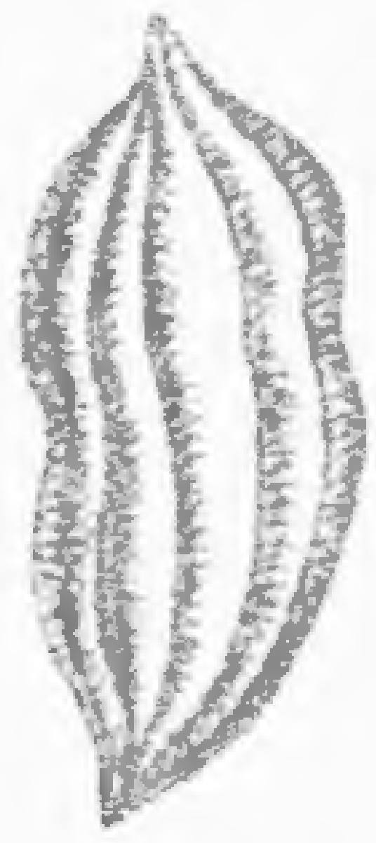

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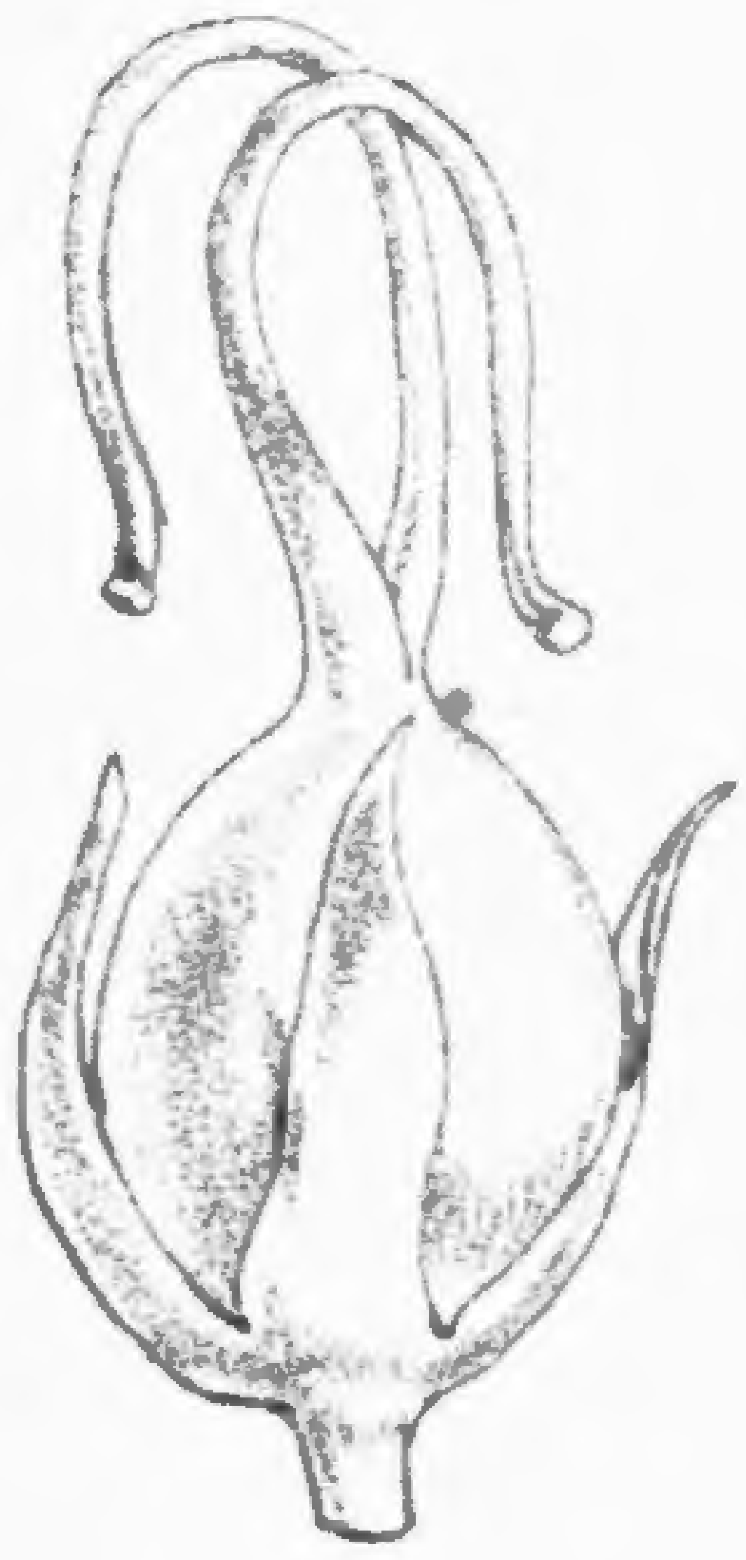

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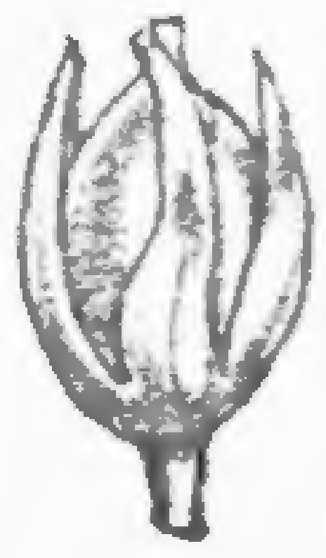

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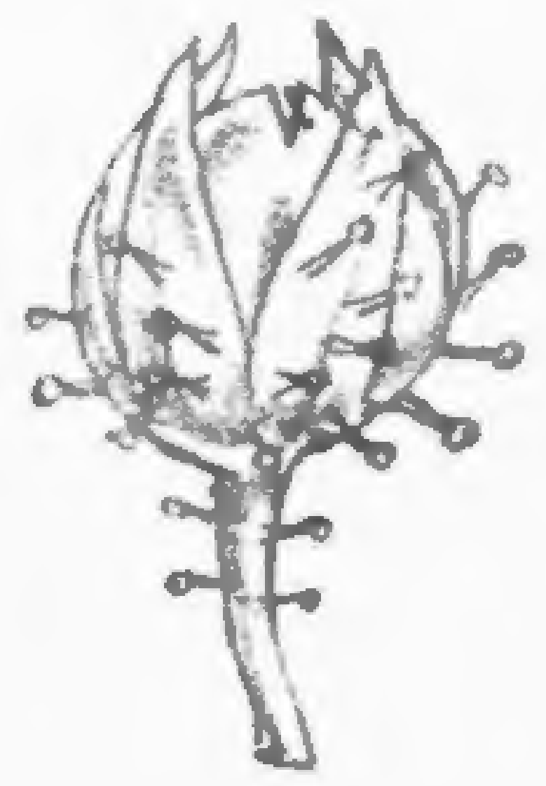

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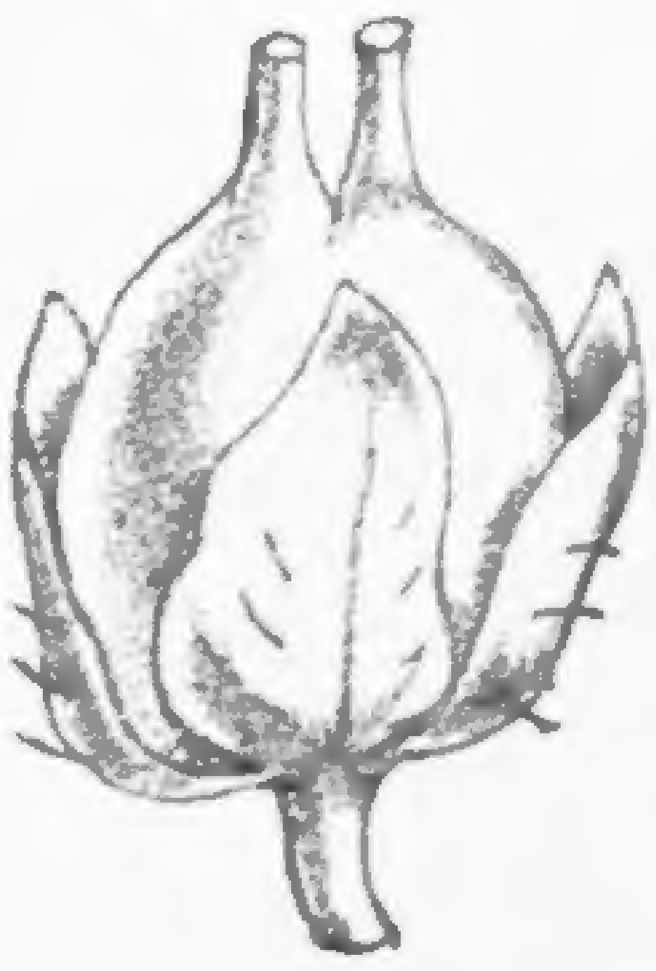

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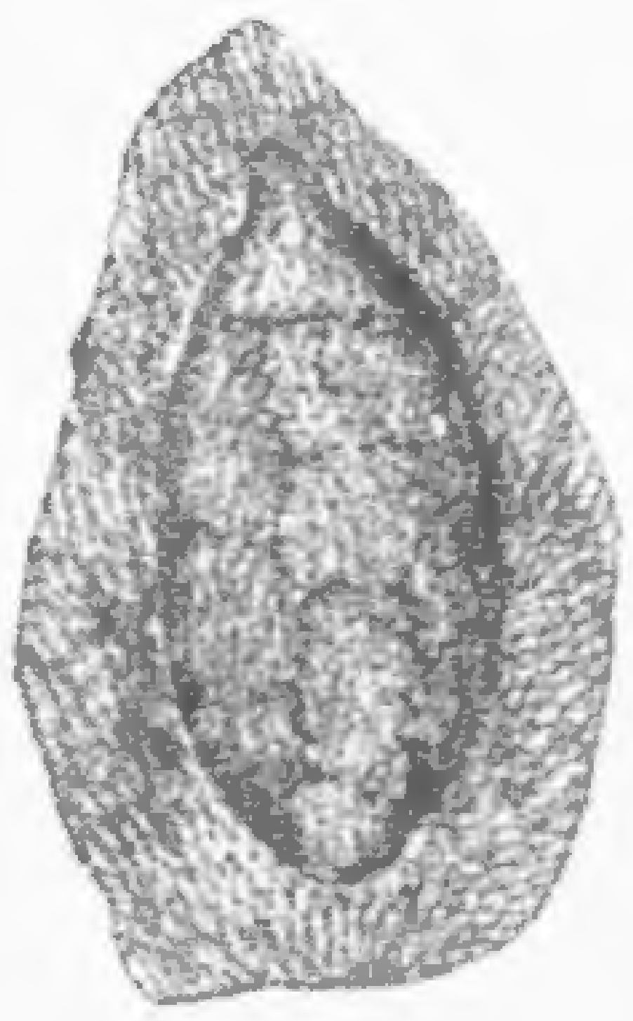

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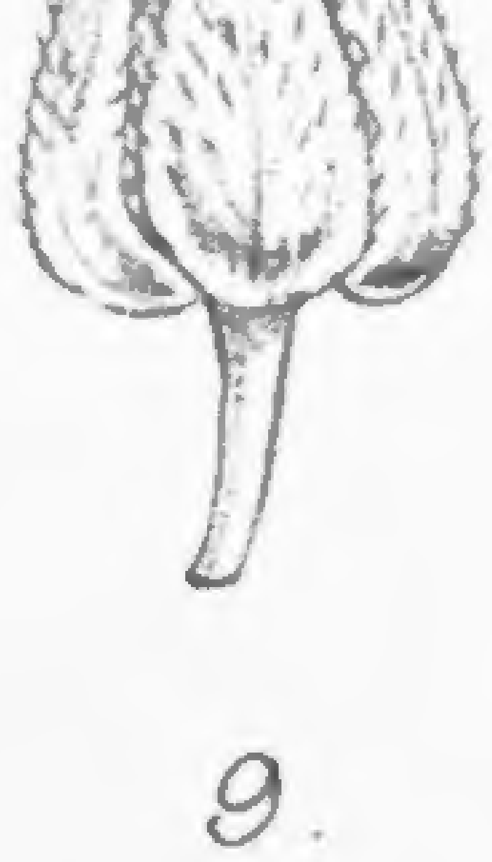

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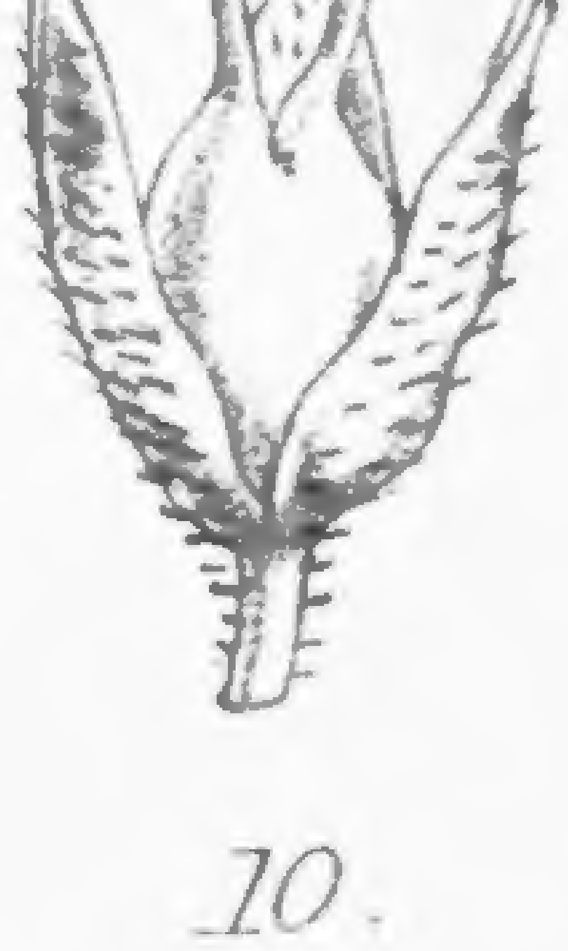

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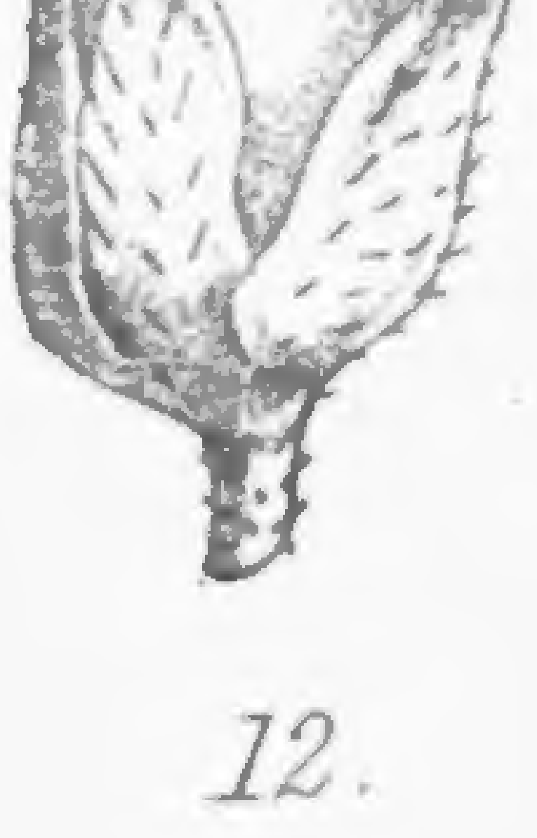

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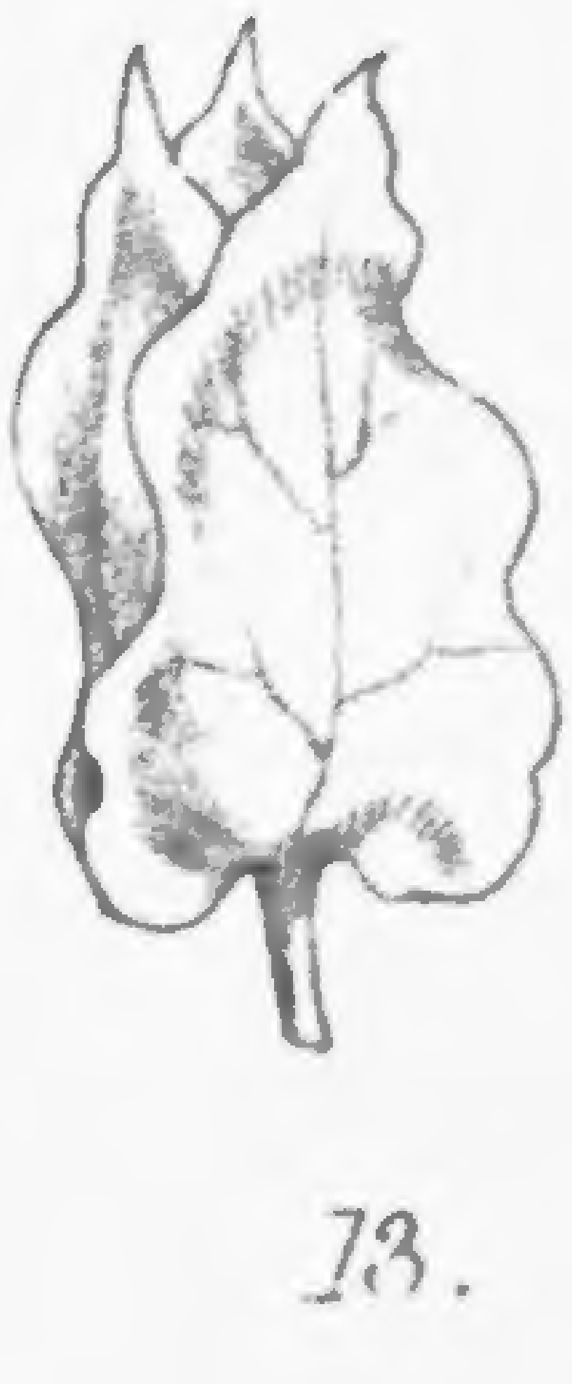

13.

A.W. Bennett, del. Fitch, lith.

J.N. Fitch, imp.

W. H. Fitch, del. et lith.

J. N. Fitch imp.

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1
2
1a
1e
1f
1g
1c
1b
1d
2a
3
1h

J.T. Moggridge del.

G. Jarman sc.